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Native Woody Plants of the United States

Their Erosion-Control and Wildlife Values

By

WILLIAM R. VAN DERSAL

Biologist

Division of Conservation Operations

Soil Conservation Service

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NATIVE WOODY PLANTS OF THE UNITED STATES, THEIR EROSION-CONTROL AND WILDLIFE VALUES

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INTRODUCTION

At no time has the need for conservation of our natural resources been as apparent as it is at present. We have seen the wasteful destruction of our most basic resource, the soil, take place at an ever-increasing rate within a comparatively short span of years. The original vegetation of the country has in large part been removed, and as a consequence of this, not only has soil become increasingly subject to erosion, but wildlife, being dependent on vegetation for existence, has also become severely depleted.

The same forces that cause soil losses have destroyed wildlife habitats. The removal of the vegetative cover has permitted washing away of topsoil, and this in turn has prevented the return of vegetation and the consequent restoration of wildlife. It is only natural, therefore, that revegetation should be relied upon to conserve soil, and since the same vegetation can be made to provide more wildlife habitats, it is possible to conserve two resources with one operation. It becomes apparent that soil conservation, if properly managed, can mean wildlife conservation.

But to carry out a program of soil and wildlife conservation vegetation must be utilized intelligently. Where considerable numbers of plants are to be employed, it is essential to know as much as possible about every species of tree, shrub, or herb we propose for planting. We should know where and on what soils a species will grow, what degree of drought or moisture it can endure, the nature and extent of its root system, its susceptibility to insects and disease, its aggressiveness, its relation to other species, its value to the landowner as a crop-producing plant, and its use as food or cover by wildlife.

In other words, the time is opportune to take inventory of the stock on hand; not to show how much has been lost, but to determine what is left to build with, and how most wisely to employ it. There exists a widely distributed mass of information concerning plants, which, if assembled and properly classified, may assist materially in dealing with soil and wildlife conservation.

This publication presents an indexed list of woody plants growing in the United States, naming each species as unmistakably as possible, and giving all available data pertinent to its use in erosion control and wildlife conservation. Such an inventory as this shows not only what is known about each species of plant but by inference what is not known. Every species is potentially a valuable resource in itself. The development of each plant resource eventually may disclose a crop as yet unsuspected.

It may be noted that this indexed list is not intended for use in the identification of plants, although characters listed here may assist in making determinations. There are manuals to cover the entire country, with the exception of Arizona and Texas. After identification is certain, this publication may be consulted for data on the use of any given woody plant.

THE RELATION OF VEGETATION TO SOIL CONSERVATION

Under our present agricultural system we are concerned with the manipulation of cultivated crops in such a manner as to keep the maximum of cover on the soil as much of the time as is possible. Such manipulated, cultivable crops may be classed as temporary vegetation. The permanent class will include plants that are permitted to remain on the ground without disturbance, except that incident to gathering from them such periodic crops as they may produce. It is with the permanent class that this publication deals.

As every soil conservationist knows, there is a very definite relation between the density of the plant cover on the soil, the amount of soil lost through erosion, and the productivity of that soil. These three functions vary in a regular and direct manner, and there is no reason to believe that they have not always done so. Soil is formed partly by vegetation, and vegetation is in good part a product of the soil. Reasoning from our observation of natural conditions, we must expect to direct our efforts to control erosion toward revegetation, since it is known that erosion starts with the destruction of the plant cover and that the kind and density of vegetation is more important in influencing run-off and erosion than is steepness of slope or intensity of rainfall.[1]

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[1] Data from the U. S. Forest Service, Intermountain Station, Ogden, Utah.

Many workers are of the opinion that a plant with a large root system is necessarily the best one to hold soil in place. This idea is so universally held that it may not be amiss to review briefly just what takes place when a soil is eroded, especially by water. In doing this we may come to understand more clearly how erosion can be prevented by restoring vegetation.

In exceptional and rare instances, washing may take place below the surface, but under ordinary conditions the washing away of soil occurs at the surface. It is the movement of soil particles downhill in water or into the air as dust that we wish to prevent. Since such movements start in the very uppermost layer of the soil, our efforts must of necessity be directed to holding topsoil in position. Roots of woody plants do not, in themselves, offer much help in the top inch or so of soil; they penetrate deeper and may be said to be holding the soil in place below but not necessarily at the surface.

Observations in the field show that soil easily washes away from roots and that the better the surface of the soil is covered, the less the soil washes. Experimental evidence has confirmed such observations. Kramer and Weaver (*346*)[2] conducted a series of tests on many kinds of plants, mostly grains and other herbs. In their experiments they discovered that it was not the soil-binding effect of roots that produced the best protection, but the plant cover, which prevented most of the water from coming in direct contact with the soil. When the plant cover was intact its effectiveness in controlling erosion exceeded that of underground parts alone many times, and comparatively little relation was found between the quantity of underground parts and resistance to erosion. They found also that cover need not be living to be effective; any kind of cover protects the soil. In the course of their experiments they noticed accidentally that a single elm leaf protected the soil below it until a column over 3 inches high, capped by the leaf, remained after the surrounding soil had been washed away. Undercutting eventually toppled the column. These experiments would appear to justify the use of a mulch in planting on eroded lands.

It is clear that since erosion is greatest at the surface the roots of woody plants have comparatively little to do with its prevention. As a matter of fact, when water washes the covering soil off and begins cascading over roots, they may only aggravate soil washing.

The surface layer of the soil can best be held in place by some sort of protective cover. This may consist of close-growing plants, litter, or a combination of the two. An effective protection for soil is afforded by a mat of grasses, which are among the best of all plants for erosion control. An equally good cover consists of an established forest and the duff produced by it. A third type might be made up of close-growing, thicket-forming shrubs and the litter produced by them or of a mat of entangled vines. Run-off and removal of soil are reduced to a minimum under such covers as these. It is almost unnecessary to mention that grass sod can be formed more quickly than can a thicket of shrubbery and that the establishment of a forest and forest litter takes longer than either of these.

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[2] Italic numbers in parentheses refer to Bibliography, p. 293.

EVALUATION OF PLANTS FOR EROSION CONTROL AND WILDLIFE

Knowing that it is the surface layer of the soil that is susceptible to erosion and that root systems may therefore be largely neglected except as they serve to hold plants in place, the plant characteristics that are useful in erosion control may be indicated. In considering these it should be kept in mind that as land on which planting is to be done may have a certain value, species that produce a valuable crop as well as furnish erosion control should be used whenever possible. The qualifications of plants valuable in erosion control may be summarized as follows:

1. Such plants must be able to thrive under the climatic conditions and in the soil in which they are to be grown; and they must be able to hold their own in competition with other plants.
2. The farther their stolons, suckers, or rhizomes spread, or the more matted the condition of their growth, the greater space they will cover and the more soil they may be expected to hold in place. Thicket-forming or mat-forming plants or those that root from decumbent or declined branches, or that form suckers or root shoots are of this class.
3. With tall-growing plants, the more litter they produce and the greater the water-holding capacity of the litter, the more effectively will the plants control erosion.
4. The bushier the plants, the denser their foliage, and the nearer evergreen they are, the more protection from wind and rain they will offer to the soil.
5. The plants should be comparatively easy to propagate. If they can be purchased on the open market they are often easier to obtain for planting.
6. The more rapid-growing species will provide protection sooner than slower-growing species.
7. If plants furnish food and cover for wildlife, their usefulness is increased through the aid they give in conserving the valuable wildlife resource.
8. The possession of such characteristics as resistance to grazing, drought, insect damage, and diseases, and the ability to grow rapidly on and to tolerate many kinds of soil, particularly alkaline, acid, saline, barren, or sterile soil, is valuable.
9. The production of some crop, as timber, pulpwood, tannin, sugar, dye, comestible or ornamental fruit, or ornamental flowers enhances the value of erosion-control plants.
10. Resistance to fire or ability to coppice after burning or cutting enables plants to maintain a cover othewise easily destroyed.

Leopold (*356*) has discussed the properties that make plants valuable as winter cover for game. The first and most important character is dense winter foliage or thorns, preferably close to the ground Second, species easily propagated, and hence easy to establish, are those that can be propagated by stem or root cuttings. This gives, he says, a great advantage to such plants as Osage-orange, willows, grapes, plum, and roses. The third important property is vigor. This includes ability to reproduce by sprouts if cut or burned, ability to spread by means of root sprouts, and ability to make quick growth. Next comes resistance to grazing, drought, shade, and fire. Finally, cover plants should be unobjectionable from the agricultural standpoint. The striking similarity of Leopold's criteria for game-cover plants and the characters valuable in erosion control is at once apparent.

It has been pointed out that the restoration of cover, important alike for soils and for wildlife, is the objective sought in soil conservation as well as in wildlife conservation. The correlation of erosion control with wildlife planting, therefore, is obviously an easy one to make. Furthermore, the utilization for wildlife production of submarginal lands upon which man-made erosion is unusually severe is a sound economic practice.

PLANTING FOR SOIL AND WILDLIFE CONSERVATION

It is obvious to those who have had experience in landscaping or forestry that the old maxim about putting all of the eggs in one basket applies very well to the planting of woody species. The most important rule to follow, whether planting for timber, pulpwood, erosion control, wildlife, or any combination of these, is that the species used must be varied—that the planting must be a mixture, not a pure stand. This is true for several reasons (*486*), namely:

1. Solid stands of plants favor the rapid spread of disease and insect pests. Fungi, as well as insects, find it easy to travel from one plant to another of the same kind. In mixed plantings spread is slower and control is consequently easier. Isolation of individuals and groups from others of their own kind is the natural safeguard against infection.
2. Solid plantations of one species have for some time been known to result in depletion of the soil. Further, pure stands do not represent the maximum productive capacity of the soil.
3. Maximum interspersion of species ensures that all ecological niches will be filled. This results in a greater utilization of space and better erosion control. Competition between individuals, and therefore waste of energy, is at its highest in pure stands.
4. In planting for wildlife, variety is essential. What one species of plant may lack, another may possess. The effort should be made to attain a well-balanced habitat, approaching as nearly as possible the "orderly confusion of nature." Insectivorous birds are generally discouraged by pure stands, but encouraged by mixtures. The encouragement of such birds leads to greater control of injurious insects. In several European countries it has been found an economically justifiable practice to put up bird houses in forest plantations to attract insectivorous birds and thereby to ensure some control of insects. The idea is extending even to this country, but proper mixing of species in planting should make such a practice unnecessary.

It is very essential that careful planning precede actual field operations. Press of work and the need that considerable planting be done in a short time are often advanced as excuses for improper spacing, poor selection of site and species, and faulty organization of the work. Actually such excuses are never valid, for the planting seasons are preceded by periods sufficiently long to permit of careful planning. Because of the impossibility of obtaining sufficient planting stock of the kind desired, it may often be necessary to substitute other species, but this should be done most carefully. If the proper species for the required job are lacking, the planting should be partially or entirely deferred until the next season.

PLANTING FOR WILDLIFE

In planting for wildlife the aim is "* * * the creation of such an environment that the maximum of food and cover is available at all seasons of the year for the particular birds or mammals considered" (*138, p. 16*). It follows that considerable care is called for in the selection of proper plant species. This is not a simple matter. Many species may be adapted for planting in a given area. Discarding those that are of little value in the control of erosion, we are left with a list of plants that have diverse values as food for wildlife.

To date, recommendations of a species for planting have rested upon the utilization of its fruit by birds or mammals. There is a difference between the importance of a certain item of food in the diet of a given bird and the value of a species of plant for wildlife in general. The one relates to the welfare of a particular species of bird, the other to the extent to which a plant is used by mammals as well as various species of birds. When the welfare of wildlife in general is to be considered we can scarcely limit our choice to a species of importance to the bobwhite alone, for example, although such use will naturally influence our choice. Furthermore, we can scarcely ignore other forms of wildlife even if we wish to encourage the production of only one.

McAtee (*369*) has said the importance of food items in the diet of a bird is not indicated by statements as to the frequency with which the items are taken. It is only under the percentage-by-bulk system (the proportion of one food taken to the total amount of all foods taken) combined with the counting of individuals, insofar as this is possible, that the nearest approximation to the truth can be made. Under the percentage-by-bulk system, he explains, comparison of one part of the diet with another or of the food of one species or group of species with that of another is possible.

But he goes on to say (*369, p. 464*), "* * * statements of the frequency of occurrence of food items in bird stomachs may perhaps be taken as rough indices of availability of the food or relish for it." And in the publications so well known to biologists engaged in wildlife management, he employs as his criterion of use the number of birds known to have eaten the fruits, buds, catkins, or other parts.

Examination of the record of the species of plants listed in this publication will show some to have been utilized by a great many species of birds and mammals. Such species should undoubtedly be given priority in making planting lists. Other species may have very poor records. This may be true often because they are actually not used by wildlife. On the other hand, they may occur in a region from which only a few bird stomachs have been examined. They may bear fruits difficult to identify by ordinary methods of stomach analysis. The fleshy fruit of *Prunus americana*, for instance, has been found only once, in the stomach of a pine grosbeak, but observers have noted that many birds eat this fruit.

It seems clear that records showing a given species to be much utilized can be accepted by technicians as proof of the value of the plant for wildlife. Poor records indicate either that a plant is worthless or that we do not know enough about it. If a species is found to have a very poor or limited record, recourse should be had to the records of the genus as a whole, exclusive of specific records, or to records of very similar species, for assistance in determining its value. Certainly, when in a genus of many species, such as *Chrysothamnus* or *Aplopappus*, few or no records of utilization by wildlife appear, it is not unreasonable to exclude the species from planting programs.

There are two available sources of information relative to the use of a plant by wildlife—stomach analyses and field observations. In most instances, the more reliable is a stomach analysis made by the Bureau of Biological Survey or other responsible agency. The lack of stomach records necessitates using reports of field observations. These are open to some criticism since accurate determination of the birds or mammals and plants involved is often not made, and since interpretation of the common names in which the records are so often made is neither easy nor certain. In this publication if the names were not thought to be clear, they have been referred to the genus. Cottam (*138*) has mentioned also that in an actual instance field observations alone were much less than 50-percent accurate in appraising food values in the diet of a bird.

The exact nutritive value of any given plant food has not yet been determined. We are yet scarcely far enough along to examine the chemical composition of various fruits and seeds of wild plants and their place in the diet of any animal. Hosley (*290*) has considered the chemical composition of some, and has noted the obvious fact that fruits may furnish vitamins. The staple value of acorns and the seed of conifers, such as pines, is well known. This field of investigation should indeed be a valuable one.

HIGHWAY PLANTING

The increasing use of vegetation for the beautification of highways makes it of interest here to mention that such work can be turned to the benefit of wildlife as well as to the control of erosion. Indeed, the conservation of soil on highway cuts can very profitably be planned with a view to beautifying the road.

Certain fundamental principles relating to highway planting have been clearly enunciated by Simonson, senior landscape architect of the Bureau of Public Roads. In the following statement he sets forth the basic ideas to be kept in mind in such work (*513*, pp. 172–174):

> The primary purpose of highway planting is to enhance the peculiar qualities in the views and scenery of the surroundings through which a highway passes so that the development within the highway limits will be properly consistent and appropriate to that which lies over the fence or beyond the highway borders, and will, therefore, present to the motorist the best of the landscape qualities inherent in it.
>
> The creation of landscape effects on the usually limited highway areas with little or almost no attention to the surroundings is not the correct approach and cannot be considered satisfactory roadside improvement. A systematic study of the native flora along and immediately adjacent to the highway will indicate

> the most appropriate plant materials to be used, and such an analytical process should develop selective appreciation of natural plantings upon the highways.
>
> The ecological or natural landscape approach to the highway planting program aims to avoid the typical static, or garden-estate type of plantation design in favor of fitness with the more dynamic requirements of highway travel.
>
> Nature is to be followed as closely as possible with fullest utilization of native materials or harmonizing types if the landscape development of highways is to proceed * * *. It is imperative, therefore, that the landscape technician adopt the broadest ecological viewpoint concerning the planting phases of the landscape development of highways.

The use of shrubs bearing beautiful fruits automatically provides food for wildlife. As Howard (*293, p. 103*) has mentioned, if roadside improvement designed primarily to improve the scenery is made with "due regard * * * to ecological associations and as much diversity as is consistent with natural groupings * * *" in the plantings, it will in all probability contribute materially to the increase of bird life in the immediate vicinity.

Plantings of species effective in erosion control provide excellent cover for wildlife. The danger of luring birds and mammals to highways where wildlife mortality is undoubtedly great can be obviated by placing plantings made for the production of wildlife food well back from the roadway. This is ordinarily done since on highway rights-of-way, plantings made too close to the road may easily become a hazard for motorists.

Highway plantings are generally given more than ordinary care. Fertilizers are often used to ensure that the plants start; and watering, pruning, and cultivating are commonly employed to assist them in growing and producing flowers or seed. Under such conditions the remarks on plant competition and succession in the section treating of the selection of species for planting may apply only partially or not at all.

The utilization of vegetation in highway planting is comparatively new, but is rapidly increasing in importance. A recent report for one State (*1*) mentions, for instance, that 700 miles of planting on main highway rights-of-way have nearly been completed. Future work may well be directed along the lines so clearly drawn by Simonson.

PLANTS OF OBJECTIONABLE CHARACTERISTICS

Certain species of plants possess characters that may partially or entirely preclude their use in many kinds of planting. A list of these would include plants that are:

1. Poisonous to man, either when taken internally or through skin irritations.
2. Poisonous to livestock, usually internally.
3. Secondary hosts to economically injurious fungi or insects.
4. Susceptible to the ravages of insects the control of which is difficult.
5. So exceedingly vigorous and aggressive as to crowd out more valuable or useful species.

It is rare to find a situation in which plants possessing one or several of the above characteristics cannot be used. However, it may often be advantageous to substitute forms less objectionable, a procedure which is usually easy since the site is very unusual upon which at least two species of good character cannot be grown.

POISONOUS PLANTS

Plants dermatitically poisonous to man ordinarily will not be planted, because collection of seed or cuttings cannot be made without exposure to the irritants. In many places such plants may be spontaneous. If they are of value in erosion control or as wildlife food or cover and particularly if they are sufficiently removed from habitations, they may often be left to perform a useful function.

The subject of livestock poisoning has been admirably treated by Chesnut and Wilcox (*119*) and by Marsh (*392*). Their authoritative generalizations are paraphrased here.

It may be stated as a general fact that the popular idea that range animals will voluntarily seek out poisonous plants and eat them from preference is not true. Animals seldom eat poisonous plants except as they are driven to do so by lack of other food. Almost all poisonous plants are distasteful to livestock and under ordinary circumstances will be avoided. Loco plants, which are herbaceous, are an exception to this rule.

The state of the local vegetation as affected by weather conditions ordinarily exercises considerable influence on the occurrence or nonoccurrence of poisoning. In the early spring certain poisonous plants may start to grow before the native grasses. If these poisonous plants are at all conspicuous or offer any considerable amount of succulent material, livestock may be tempted to eat them. The acrid, bitter, or otherwise disagreeable taste of such plants seems not to deter livestock. Sheep and cattle may often eat large quantities of plants that are extremely distasteful to the human palate.

In seasons of unusual drought, grasses on the range may become thoroughly dry while other plants remain green and tempting. It is obvious that livestock will be more apt to eat poisonous plants when such plants offer more tempting forage than the grasses. It is equally obvious that when grasses and other harmless forage plants are present in abundance and in good condition, sheep and cattle less often make the mistake of eating poisonous plants.

To prevent poisoning of livestock, reliance should be placed on prevention rather than remedies. Animals must be so well cared for that they will not be tempted to eat poisonous plants. They must be prevented from eating such plants by careful handling of the herds. It must always be borne in mind that animals seldom eat poisonous plants by preference, but that under starvation conditions they may be driven to do so with disastrous results.

Usually, in selecting stock for planting, nontoxic species can be chosen. In rare instances, however, certain toxic forms may be the only ones capable of doing the job. In such event, great care should be exercised to see that plantings will not be available to livestock. This can be accomplished either by fencing or by proper management of the herd.

AGGRESSIVE PLANTS

Whether to include or exclude a species that may become a pest is often a difficult decision to make. Extreme aggressiveness may be the character necessary for successfully controlling a given site, but if such aggressive species spread and become a nuisance because they are difficult to eradicate, the planter may often regret having used them.

No species of woody plant is a pest throughout the country, and native species are far less troublesome than introduced ones. *Symphoricarpos* is considered a weed in places and a boon in others. *Rubus* and *Smilax* are a nuisance where they cover large areas. *Lonicera japonica* is a very pernicious weed in woodlands, *Campsis radicans* and *Potentilla fruticosa* in pastures. *Ailanthus altissima* has been known to supplant native forest trees, and *Cytisus scoparius* may run wild on sandy soil.

Such plants as these form cover for soil and some produce a secondary crop. Again, as with poisonous plants, common sense and caution should be used. If a species is really pernicious in a given region, if it easily escapes and quickly becomes widespread, and particularly if other species can be used, the better decision would be to discard it.

PLANTS HARBORING FUNGI OR INSECT PESTS

At the present time there are nine Federal domestic quarantines affecting interstate movement of plants and plant products. These quarantines have been established to protect crops and forests from pests of major importance. Most regulations permit movement after inspection or treatment of the material to ensure freedom from infestation. The recognition by planting technicians of the fact that certain plants may assist in spreading diseases or insects that may cause serious loss of farm crops or forest trees as well as the plantings themselves, is essential. Familiarity with State and Federal regulations before plans are made is very necessary, and the technician should cooperate in preventing the spread of pests.

The recognition of rust hosts is of particular importance. Among the rust fungi the separate development of spore forms on unrelated hosts has taken place. Approximately one-twelfth of the species of rust fungi exhibits this character of heteroecism. The completion of their life cycle depends on two host species, either or both of which may be an important or valued crop. It is thus evident that certain secondary hosts to economically important fungi must be eliminated from plans for planting woody species if the agricultural crop attacked by the fungus is of any importance in the vicinity of the planting. The more important woody species that act as secondary hosts are indicated in the list of woody plants.

One of the measures taken to prevent the spread of rusts is the eradication of the secondary host that is of less importance economically. Such eradication programs are now in effect under various State agencies and the Bureau of Entomology and Plant Quarantine. Any technician engaged in planting operations should consult with State and Federal plant quarantine officials before making actual plantings whenever there is any doubt as to the legality of the operations.

Eradication measures intended for the destruction of wild species known to harbor insect pests are also being carried on. Plants known to harbor a serious insect pest during that portion of the year in which nearby crops are materially damaged by that insect should be used with great discretion. Authorities of agencies engaged in control and eradication of pests should always be consulted.

SELECTION OF SPECIES FOR PLANTING

PRIMARY SUCCESSION

The factors governing survival must be recognized when a plant is placed among others to compete with them for a place in the sun. These factors or survival values are measured in terms of species requirements, although we often state them by speaking of the tolerance of a plant for shade, sun, acid or alkaline soil, drought, and moisture. Because no experiments have been conducted, it has been assumed by some technicians that there is no scientific basis on which to judge the ability of one species to compete on the same ground and under the same conditions with another species. This is by no means true.

For at least 20,000 years in the northern United States, and for a much longer time in the southern part, the species comprising the flora of the country have been competing for position, settling themselves little by little into their respective ecological niches and associations. On any given area of ground there has grown a succession of associations of plants which, as they have contributed to the gradual modification of the soil (or rock) on which they grew, have eventually been replaced by plants of a different association. After sufficient time, an association of plants has appeared which, under the existing environmental conditions appears to be the best adapted to the area. This group is often known as a climax, and although it is recognized that a completely stabilized environment never exists, the climax regions for the country have been more or less accurately mapped. Associations of grasses are considered to be the climax for the Plains region; certain climax associations of deciduous trees appear in the eastern part of the country; evergreen trees constitute a climax for the western coastal region; and there is a xerophilous association of succulents and leathery species that forms the climax in the deserts of the Southwest. It should be kept clearly in mind that every plant association, whether climax or preclimax, is the outcome of long ages of natural selection.

Enough work has been done to enable us to predict the climax for most areas with some confidence, but it may be many years before the date of the climax can be predicted, if that ever becomes possible. In a general way we know what species tend to occur together, and on what sites they are to be expected, in any given succession in any part of the country. Careful observation of a species in its native, undisturbed (or disturbed) habitat will usually demonstrate where and how it fits into its environment. According to Shantz (*504, p. 357*):

> A thorough understanding of the natural vegetation climax and of the secondary stages leading to its re-establishment when it is once destroyed is the best basis for a revegetation and erosion-control program.

For many years plant ecologists have been engaged in determining the fundamental principles concerned with the initiation, development, and maturity of plant associations on given sites. The slow encroachment of lichens and mosses on bare rock, followed by gradual appearance of higher plants, the development of soil, and the invasion and succession of later associations tending toward a stable interrelation between soil, vegetation, and climate has long been known. Similarly, the accumulation of debris causing submerged water plants eventually to give way before the advancing shore plants, and these in turn before the successful competition of swamp forests and later dry land forests, has been studied in considerable detail.

SECONDARY SUCCESSION AND PIONEER SPECIES

In primary successions, as delineated above, the orderly and slow process of replacement of one association by another proceeds under natural conditions. As a consequence of the activities of man, however, these successions are often violently interrupted for shorter or longer periods, and new plant associations very different in composition from the original ones may initiate secondary successions. These may be started as a result of fire, overgrazing, logging, cultivation, road building, coal stripping or other digging operations, blowing of sand, and even the activities of mound-building animals. The climax toward which they develop, however, is the same as would have been developed by the original vegetation. It is with these secondary successions that technicians have most to deal.

It is no longer new to point out that we are now dealing not with biologic areas as they were, but as man's activities have changed them. Students of plant ecology and geography have long recognized that existing vegetation and fauna do not represent original conditions. As time goes on, studies of original vegetation must deal more and more with old records, historical documents, travel sketches of earlier periods, early surveys, and consideration of the few remaining virgin areas. Original faunal and floral areas can be determined only in this manner. Man has been relocating species of animals and plants to suit himself from the time the first settlers arrived in the country. Brief consideration of the changing face of the land surface of the country shows this very clearly. Furthermore, it is obvious that because most vegetation has been disturbed by man, associations comprising secondary successions are the rule rather than the exception.

It is regrettable but true that it is not known with certainty just why one association gives way to another. It seems probable that changes in the substratum play a considerable part, but those changes cannot be measured accurately enough to say that at one time certain plants will succeed; at another, different plants will thrive. So far it has simply been noted that in any type of succession a series of what appears to be preparatory stages must precede the climax. It may also be noted that as a consequence, or perhaps as a parallel phenomenon, the food of wildlife and the fauna itself changes. Certain pioneer plants lead the way and very rarely persist through all stages to the climax. Conversely, climax species almost never act as pioneers. Edaphic factors appear to be very important in the preliminary stages of secondary successions.

In applying these facts to planting, where no further care is to be given to the plants, one may with reason select for use pioneer species that have demonstrated their ability to succeed on areas variously disturbed by man. This is of great importance. We see that under natural conditions the preparation of an area for occupation by climax species is undertaken by pioneer species. They do not last long, considering the length of time required for the appearance of the climax stages; if they are planted, we can rely upon their being replaced, sooner or later, by other species. But the initiation of a secondary succession will ensure the control of erosion on a given area and the production of habitats useful for wildlife.

A list of pioneer species for various areas throughout the United States could easily be drawn up here. A much more certain manner of determining them, however, is to examine eroded areas where pioneers have already begun to grow. The identification of the species informs the technician what to plant. And, it may be emphasized that the pioneers observed on such places are the results of long ages of natural selection of a sort that permits the survival of only those best adapted to initiate successions. With proper interpretation of the results of such long-time, natural "experimental plantings" the reclamation of eroded land can be carried out with confidence.

With these ideas in mind a principle may be stated that any technician who wishes to plant woody species to control erosion would do well to remember; namely, that careful observation of local vegetational successions, coupled with accurate determination of the species involved, will often indicate the best means to employ. As Shantz (*504, p. 355*) has said: "Wherever one looks, nature has pointed the way to recovery."

We have in this country one vast testing ground, comprising many kinds of climate, soil, and site, wherein species have failed or succeeded for significantly long periods. As long as a species is planted within its known range of occurrence, in its proper site as determined by observation of its so-called preferences, and is intermingled with other species in a ratio and position approaching natural conditions, we may be satisfied that except for failures attributable to serious local variations in environment our plants will grow and thrive. Aldous and Shantz (*9*) point out that the natural or normal plant cover is a result of all the growing conditions of the area wherein it is produced. It is, therefore, an index or measure of the factors influencing its growth, and it serves as an indicator of the possibilities of producing other plants on the same land.

NATIVE VERSUS INTRODUCED SPECIES

A clear distinction should be made between crop plants that must be planted and cultivated each year, or every several years, and woody plants, which are untended and uncultivated (if planted in the wild) and which must depend for their existence upon any ability they may have to compete successfully with the native species that will eventually grow around them or that are already there. In planting species on sites where they must be able to survive competition, it is hazardous to select plants other than those that have already shown themselves capable of succeeding in similar sites. If all competition is to be removed through cultivation, then such an argument would necessarily be invalid. Erosion cannot be controlled by cultivation alone, however, and most sites needing revegetation with woody plants are those that are being retired from cultivation, not those on which cultivation is still to be practiced.

Many technicians engaged in planting apparently do not understand that our first choice of species for planting on a given site should be those that have already been tested for such a site; that is, species native to the region in question. Our second choice should be species that are not native; that is, exotic or introduced plants. If it is certainly known that there is no native species that can grow on a chosen site, then we are justified in turning to exotic forms. Clements (*121, p. 360*) summarized this: "* * * nature is to be followed as closely as possible, and hence native materials alone are to be employed, preferably from the outset, but invariably in the final composition." Chapman (*118*) claims further that until additional data can be obtained we are justified in making large-scale plantings only on the basis of ecological principles applied to the native species of the region.

This should not be interpreted to mean that the introduction of a foreign species is inherently undesirable. It is recognized, of course, that the introduction of some non-native woody species has already been successfully accomplished, and these are excepted from the preceding statements. But large-scale plantings should be limited to species proved to be adaptable to a given area and known to be able to compete with plants that now largely occupy the territory. In forest planting, Toumey and Korstian (*573*) characterize the selection of exotics and species from widely different regions as very hazardous. In ornamental planting, where each plant is protected and given special protection, the use of exotics may be justified, but unless actual experimental plantings have been made or unless site factors can definitely be shown to be similar to those of the region from which the species is introduced, exotic species should be excluded from forest crops. The extensive use of Scotch pine and Norway spruce for instance, in the eastern United States is much to be regretted in the opinion of these workers, since results from such use are still problematical.

FRUIT PRODUCTION

Wherever dioecious species are used, if fruit production is desired, a few staminate (pollen-bearing) plants must be included in the planting. Monoecious plants, on the other hand, since both staminate and pistillate flowers are present on each bush, necessitate no such precaution. Examples of dioecious plants include *Baccharis*, *Ilex*, *Maclura*, *Myrica*, *Shepherdia*, *Taxus*, and some species of *Juniperus*.

There are, in addition, some species that are partly dioecious, that is, some of the plants may be entirely staminate and some slightly polygamous. In the latter, sufficient staminate flowers are present on pistillate plants to ensure reasonably complete fertilization. The genera *Celastrus*, *Ailanthus*, *Morus*, *Rhus*, and *Vitis*, furnish species of this sort (*619*). With these, the addition of staminate forms to a planting may often be advantageous although not always necessary.

At present there is no way to distinguish readily the seeds that will produce staminate from those that will produce pistillate plants. Therefore, to ensure getting fruit-bearing plants it may be necessary to use cuttings only, selecting them mainly from pistillate plants. In reproducing such plants from seed, the proportion of staminate to pistillate plants is often unknown.

Other sorts of dioecism are known. Perfect flowers may often produce pollen that for various reasons may be more or less incapable of fertilization of the pistil in the same flower or even of those on the same plant. An instance of such a condition is found in the wild plums where one plant often gives rise vegetatively to a colony. The pollen in the flowers of the whole colony may be unable to effect fertilization, and it is thus necessary in planting for wildlife food, to ensure that stock planted is collected from at least several different colonies and well mixed before using. According to Paul B. Sears, who has experimented with plums, it is nearly always possible to induce better fruit production in one colony by introducing a few plants from a neighboring colony, or even by throwing flowering branches from a different colony into the first.

Production of fruit depends also on such environmental factors as temperature or cloudiness and precipitation during flowering. These conditions may very often be local, and certainly account in part for the patchy distribution of fruit production of the same species. Also, many plants that produce fruit freely in the sun will produce very little in the shade, as *Corylus*, *Symphoricarpos*, and *Parthenocissus*. For this reason where fruit for wildlife is desired, a variety of species, blooming at different times, is necessary for ultimate production.

THE CORRELATION OF SOILS AND PLANT GROWTH

Many statements that a given species will grow on a certain kind of soil will be found herein. These statements are based for the most part on observations of plants in their native habitats, made by many different workers. They are extremely general, the correlation of vegetation with soils being by no means certain. Soil studies that have been made deal with factors that are not directly related to plants, or else the relation of plants to such factors is not yet clear (*363*).

The distribution of some plants appears to depend directly on certain edaphic characters. Many species are almost entirely confined to acid or to alkaline soils. The near absence of legumes from very acid soils may be attributed to the inability of their symbiotic bacteria to succeed under acid conditions. Similarly, the ability of certain fungi to succeed under varying degrees of hydrogen-ion concentration may condition the ecesis of woody plants on the roots of which they form mycorrhiza. The presence of toxic substances, the release of which may depend also on acidity, may prevent a plant from growing on a soil that under different local conditions might easily support that plant. The break-down of litter, for example, is not at all understood. For such reasons as these, and for many others, we are far from having identified the factors in soil whose variations are responsible for the local variations in plant distribution.

Certain physical factors of soil, however, are worth mentioning here. Shallow soils on an impervious subsoil may endanger the stability of trees by restricting root growth. Heavy soils may act in the same way. Soils of spring-fed swamps and northern slopes are generally colder than other soils, and sandy soils and soils of southern slopes are generally warmer (*573*). Higher and lower soil temperatures have respectively a stimulating and retarding effect on plant metabolism.

DEVELOPMENT OF THE PLANT-GROWTH REGION MAP[3]

The need for a map that designates zones or areas having fairly uniform growing conditions for plants was recognized when an attempt was made to discuss where in the United States different roses could be grown and also when recommendations for the planting of trees on city streets throughout the country were desired.

To show regions where the different types of roses could be grown with a minimum of attention a rose zone map was prepared and was published in the Atlas of American Agriculture (*45*) and in the American Rose Annual (*17*). It raised a storm of protest by growers and occasioned much discussion among them because roses were being successfully grown far beyond the zones indicated for each group. This success was due to the fact that special attention had been given to their culture, particularly to winter protection. Eventually it was generally conceded that the map showed what it purported to show.

A map was made as a basis for recommending street trees and was published in a Department Bulletin, Street Trees (*417*), and again in a Farmers' Bulletin, Trees for Town and City Streets (*418*). This map divided the country into 13 zones. The zoning was based on a combination of field studies in different parts of the country and a review of the literature of tree planting. Before the tree lists to accompany the map were completed it became evident that more zones would have been desirable but this limited number was what seemed practicable at the time.

The aim in preparing these maps, and the later one appearing in this publication (fig. 1), is to delimit areas with growing conditions sufficiently similar so that a large proportion of the plants that will grow in any one part of each zone will grow reasonably well in all of it. This makes it possible to draw up lists of plants that can be recommended for growing in each region.

Factors influencing growing conditions are latitude and altitude, which have a direct bearing on temperature, frosts, and length of growing season as well as extremes of temperature; rainfall, totals and distribution through the year; humidity as influenced by rainfall and winds; soil type and character; and amount and intensity of sunshine. Often these factors change very gradually so that there is no sharp natural line of demarcation. In such instances almost arbitrary limits must be established in order that the regions shall not be too large to have reasonably uniform conditions throughout. Examples of areas thus delineated are those included in regions 15 and 16 and in regions 18, 19, and 20. In each of these two groups of regions the changes are so gradual from north to south that it is difficult to know where to draw the separating line or lines, but the total difference between the northern parts and the southern appears to call for separation. In the absence of other marked factors the north and south limits of these regions have been determined by the characteristic farm crops of each.

It is seldom that the range of natural distribution of any two plants is exactly the same; nor is the range of successful cultivation of any two plants more likely to coincide. Although the lines on the growth-region map give the approximate limit of distribution of plants it

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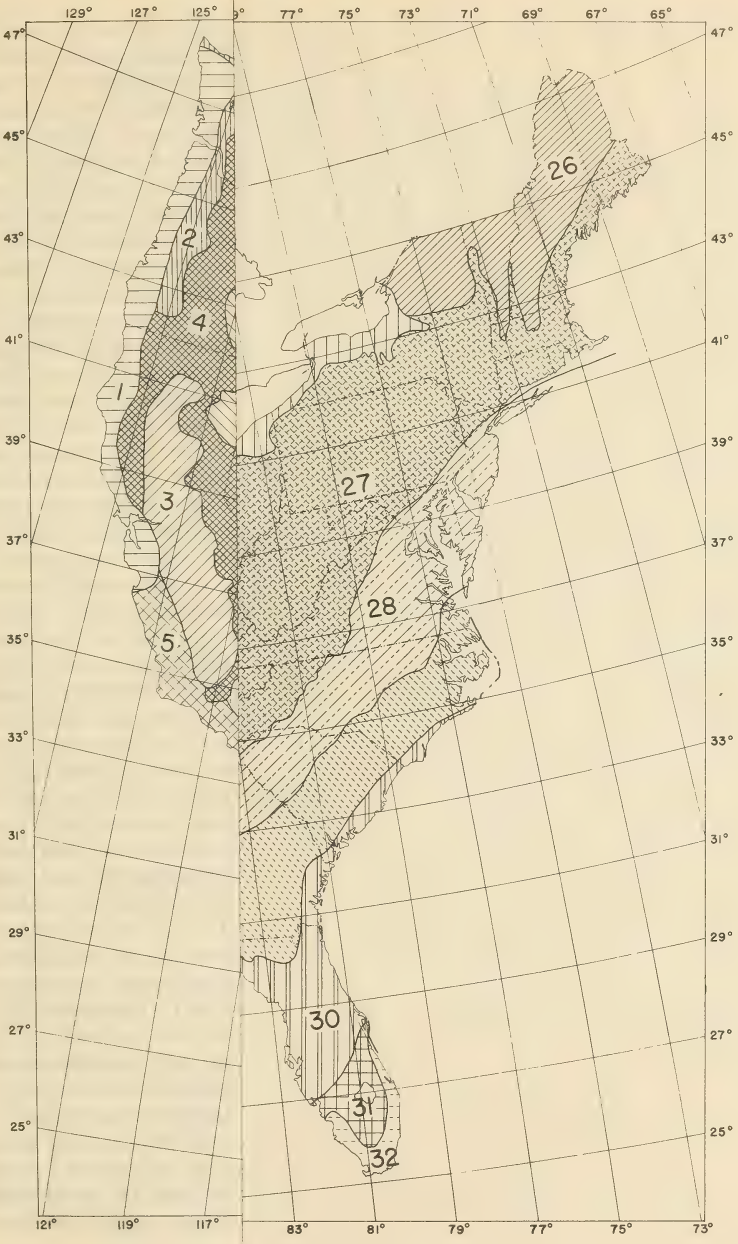
[3] This section was written by Furman Lloyd Mulford, associate horticulturist, Bureau of Plant Industry.

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE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77°
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8 Piedmont.
9 Upper Coastal Plain
0 Swampy Coastal Plain.
1 South-Central Florida.
2 Subtropical Florida.

1937

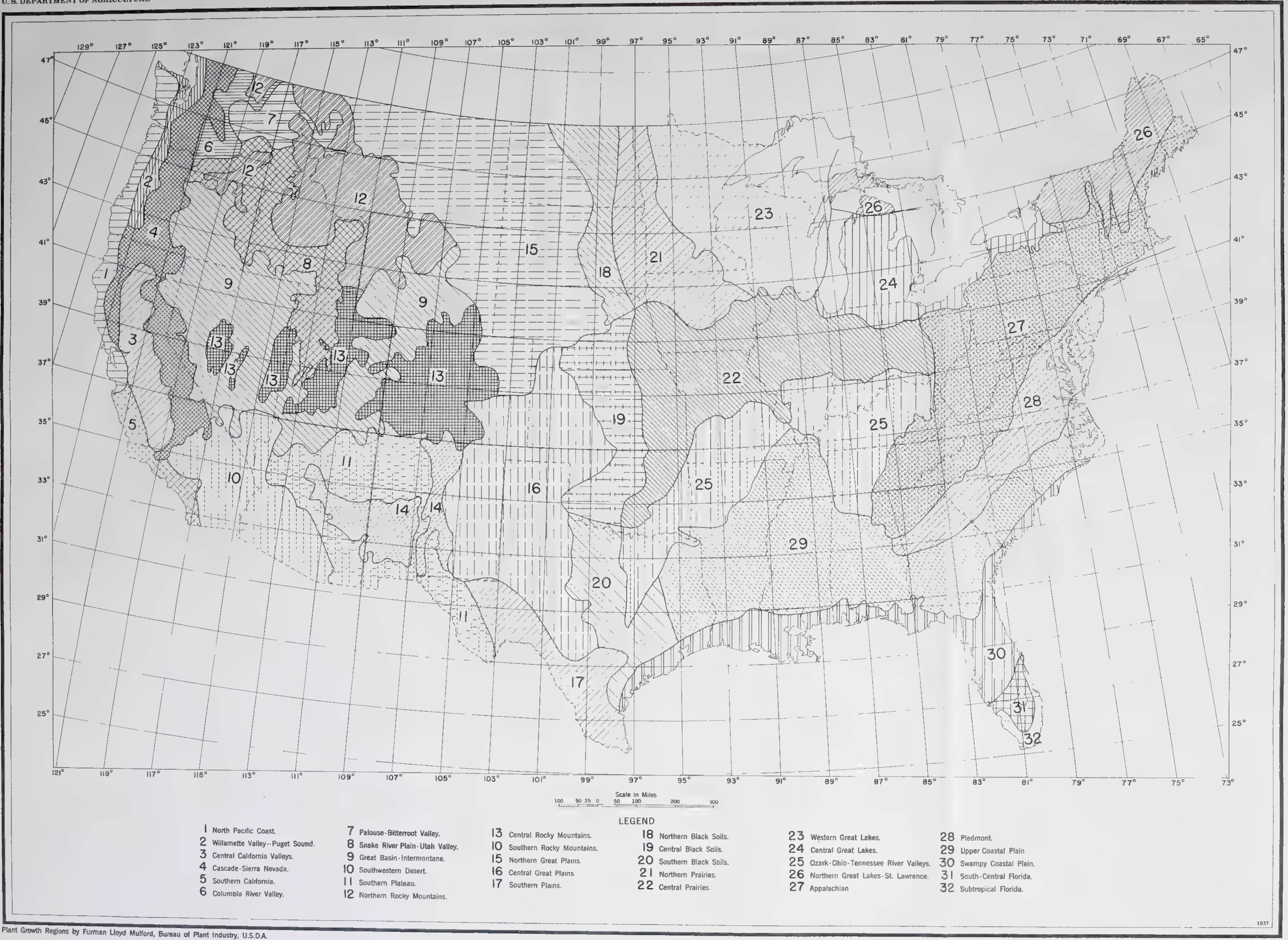
Plant Growth Regions by Furman Lloyd Mulford, Bure

Map prepared by Cartographic Drafting Unit

U. S. DEPARTMENT OF AGRICULTURE

PLANT GROWTH REGIONS OF THE UNITED STATES

SOIL CONSERVATION SERVICE



LEGEND

1 North Pacific Coast.
2 Willamette Valley--Puget Sound.
3 Central California Valleys.
4 Cascade-Sierra Nevada.
5 Southern California.
6 Columbia River Valley.
7 Palouse-Bitterroot Valley.
8 Snake River Plain-Utah Valley.
9 Great Basin-Intermontane.
10 Southwestern Desert.
11 Southern Plateau.
12 Northern Rocky Mountains.
13 Central Rocky Mountains.
10 Southern Rocky Mountains.
15 Northern Great Plains.
16 Central Great Plains
17 Southern Plains.
18 Northern Black Soils.
19 Central Black Soils.
20 Southern Black Soils.
21 Northern Prairies.
22 Central Prairies.
23 Western Great Lakes.
24 Central Great Lakes.
25 Ozark-Ohio-Tennessee River Valleys.
26 Northern Great Lakes-St. Lawrence.
27 Appalachian
28 Piedmont.
29 Upper Coastal Plain
30 Swampy Coastal Plain.
31 South-Central Florida.
32 Subtropical Florida.

Plant Growth Regions by Furman Lloyd Mulford, Bureau of Plant Industry, U.S.D.A.

Figure 1

Map prepared by Cartographic Drafting Unit

will be found that the natural distribution, or the area of usual cultivation, often does not coincide with the area that is shown on the map to be adapted to them. As a matter of fact, the growing of the plants may often occur beyond the area designated for them, or they may not be known over all the area suggested for them even though conditions are apparently satisfactory for their success. This overlapping of adjacent areas may be only slight, but again it may extend much beyond the zone lines.

It must also be recognized, however, that some plants will grow only under special conditions and that only in areas providing these conditions can they be expected to thrive. Bog, marsh, and water plants will grow only near or in water in whatever region they are found. Likewise plants adapted to dry knolls, ridges, or to sandy areas grow only in such locations, and those needing acid soils, alkaline soils, shade, or full sunlight can be expected to thrive only when those conditions are provided. Recommendations of plants having special requirements can be made for the different regions in the same way that plants thriving under more general conditions are listed, with notations concerning their special requirements.

When the 13-zone map was published it was recognized that some of the regions were too inclusive but for various reasons it was not deemed desirable to subdivide them at that time. Studies were immediately begun, however, looking toward making the regions smaller and more informing without going into too much detail. The number of regions was doubled, but as the study progressed it became obvious that important differences in plant reaction and plant associations would be ignored unless more regions were included, so the number was increased to 29 zones, then to 30, and eventually to 32.

The subdivision was begun by combining the known natural distribution of plants with regions of successful cultivation of trees, shrubs, and herbaceous perennials. Careful consideration was given to Weather Bureau maps of rainfall totals and distribution through the year and of temperatures, not only maximum and minimum but frost dates and length of growing season. These results were carefully checked with O. E. Baker, of the Bureau of Agricultural Economics, in relation to his crop-geography studies, and the resulting modifications were later made in the growth-region limits.

Subsequently the map was checked with the late Curtis F. Marbut, of the Bureau of Chemistry and Soils, and the zone lines were made to conform to the outline of soil types where there were no apparent discrepancies between the field studies and these modified outlines.

Since the original publication of the 32-zone map in 1922 there have been many opportunities to consult with students having intimate knowledge of relatively local areas and all such opportunities have been utilized to check the accuracy of details. This has resulted in a few slight modifications.

PLANT-GROWTH REGIONS

FACTORS IN PLANT DISTRIBUTION

There are three factors of great importance in the distribution of any given plant. Each may act separately, although they commonly operate in combination. They are climate, soil, and time.

Climate, which is an expression of temperature and moisture conditions, is without question of first importance. It is, in fact, a summary of factors pertaining to water and to heat. Such factors may be further subdivided into amount and distribution of water or heat; or where the two interact the terms of the analysis are evaporation, kind of precipitation, and humidity.

Soil, which involves both chemical and physical structure, is undoubtedly of second importance. Plant distribution within areas of uniform climate may be modified within each area by soil factors, but it seems obvious that the climate plays the major role in preventing vegetation from spreading. The interaction of soil and climate (the latter is often a contributing factor in the formation or modification of the former) may be of great importance. With sufficient rainfall, for instance, the leaching out of certain bases may produce an acid or neutral soil; with insufficient rainfall the soil may be alkaline.

Both the preceding factors may operate provided sufficient time has elapsed. A newly-formed species must have time to spread before its range can be delimited by changes in climate or soil. If a species is young, its climatic and edaphic boundaries may not yet be operating. In its distribution, time is still a very important factor. If a species is old enough so that its further distribution is limited by factors of climate or soil, time has ceased to be an important factor in its present distribution.

It is true that climatic and soil factors may be uniform or may change very slightly over a given area of country, as in any of Mulford's plant-growth regions. Knowing empirically that a number of cultivated plants succeeded about equally well throughout such a growth region, we are reasonably safe in assuming that in general the range of a native species can coincide with boundaries of such growth regions provided it has had the necessary time to spread. It is significant that where there is a large number of endemics and where great variation in characters is evident the growth-region boundaries do not coincide at all well with limits of distribution, but where there are few endemics and variation is much less, the boundaries coincide much better.

The correlation of Mulford's plant-growth regions with natural vegetation areas has as yet not appeared in print. The present author has been interested in the idea for the last 5 or 6 years, has checked a few species with care, and a great many in a general manner. The subject cannot be dealt with adequately here, but it can be said that in a general way correspondence of the lines bounding the range of a given woody species with the lines bounding Mulford's plant-growth regions is very close. Correspondence of the growth-region lines with climatic and soil boundary lines is also close, where either the temperature, precipitation, or soil condition, or any combination of them, acts as a limiting factor in plant distribution.

A line bounding a growth region may be considered to consist of series of attached shorter lines, each representing a change in soil condition, in average precipitation, in average temperature, or some other change displayed by plant distribution. On the map (fig. 1), the lines must be considered not as sharply delimiting one region, but as being drawn to separate two regions differing in one or more factors of the environment. They take no cognizance of local physiographic areas, which may themselves cause a change in soil, temperature, or rainfall. Major physiographic areas only are recognized. In other words, the map is generalized.

Vegetation areas, as they can be delineated from the notes of old surveyors and travelers, are more or less understood, but growth areas must be better and better known as we proceed to apply ecological principles to land use. Anyone thoroughly familiar with local conditions in a smaller area, such as a county or even a State, can point at once to places on Mulford's map where the conditions are not as represented. Mountain tops in region 11, for instance, should all be characterized as 14, with the growing conditions of which they more nearly coincide. But the expression of more or less average conditions over the whole country is fairly accurate.

In the following characterizations of conditions in the growth regions, three main items are included for each: (1) The climate, expressed in terms of Thornthwaite's climatic provinces (*570*), (2) the length of the growing season, that is, the average number of days between the last killing frost in the spring and the first killing frost in the fall, and (3) the average annual number of days with snow cover. All three items have a considerable influence upon the growth of plants.

THORNTHWAITE'S CLIMATIC PROVINCES

Consideration of the map showing climatic regions superimposed on plant-growth region (fig. 2, in pocket) or of Thornthwaite's original work (*570*) will show the climatic provinces to be characterized by three factors; humidity, temperature, and seasonal distribution of precipitation. The combination of these three forms a climatic province.

The five major humidity provinces are characterized as A (wet), B (humid), C (subhumid), D (semiarid), and E (arid). To determine them, the procedure was as follows: The total monthly precipitation divided by the total evaporation was determined for every station whose temperature and precipitation records extended through a range of 10 years or more. The sum of the 12 monthly P–E ratios was called the P–E index, or the precipitation effectiveness of the station. Through field observation and study of vegetation maps and monographs the five major humidity provinces were recognized and defined. Where the P–E index was 128 and above, the humidity province was designated as A (wet). Similarly, P–E index 64–127 defines B (humid); 32–63, C (subhumid); 16–31, D (semiarid); and less than 16, E (arid). Characteristic vegetation for A is rain forest; for B, forest; for C, grassland; for D, steppe; and for E, desert.

Four subtypes were recognized:

r=moisture abundant at all seasons.
s=moisture deficient in summer.
w=moisture deficient in winter.
d=moisture deficient at all seasons.

The determination of the four subtypes depends upon the relation existing between the P–E index and the sum of the P–E ratios of summer or winter, depending upon which is greater.

The limiting effect of temperature on plants was expressed in the same manner. The coefficient for temperature efficiency Thornthwaite called the T–E ratio. The sum of the 12 monthly ratios for any station he called the T–E index. Determining by empirical means an equation that gave the poleward limit of tundra a T–E index of zero and the poleward limit of the tropical rain forest and savannah a T–E index of 128 (which was the same as the P–E index of the arid margin of the rain forest), six temperature provinces were defined as follows:

A′ (tropical), T–E index 128 and above.
B′ (mesothermal), T–E index 64–127.
C′ (microthermal), T–E index 32–63.
D′ (taiga), T–E index 16–31.
E′ (tundra), T–E index 1–15.
F′ (frost), T–E index 0.

The sixth province rarely occurs in the United States.

Where temperature efficiency is adequate, variations in precipitation effectiveness establish the primary climatic boundaries; otherwise temperature efficiency is the limiting factor and determines the boundaries. The combination of the two produces a climatic province, in which various combinations of temperature effectiveness, precipitation effectiveness, and seasonal distribution of precipitation are possible, as shown in figure 2.

LENGTH OF THE GROWING SEASON

The figures for the length of growing season are taken from the Atlas of American Agriculture (*45*). Reference to the map showing average annual frost-free season will show any portion of the country to be included between lines that indicate the average length of growing season. Between any two such lines is an area wherein the average annual frost-free season changes with the distance from any designated line. It is obvious that an average or mean cannot vary, but it is equally plain that it may be different in one place from what it is in another. Therefore, in the characterizations under each region when the statement is made, for instance, that the average is from 10 to 20 in the northern portion and from 40 to 50 in the southern, it is meant that in the northern portion of the region in question the average of the extreme north may be 10, but at a short distance south it may be 20. In the southern portion likewise, the average may be 50 in the extreme south and a certain number of miles north only 40. But it should be clear from this example that the growing season in the northern portion, changing in length from one place to another, varies from 10 to 20 and that the growing season of the southern portion varies likewise from 40 to 50.

SNOW COVER

The figures for number of days with snow cover are taken from the Atlas of American Agriculture (*45*). Here, as in the discussion of the growing season, the average annual figure is said to vary. Again it is obvious that averages do not vary, but may change with distance. When it is said, for instance, that the average annual number of days with snow cover is from 1 to 10, it is to be understood that the average figure changes with distance; that somewhere in between the lines expressing 1 and 10 will be places where the average may be 2, 3, 4, or any number between 1 and 10.

With this explanation, the climatic characters of each region may now be considered very briefly, bearing in mind that the values given are averages, not absolute figures. Study of the two maps (figs. 2 and 3, in the pocket) may assist in a better understanding of the climate and soil in any given plant growth region. In figure 2 the climatic regions of Thornthwaite (in color) are superimposed on Mulford's plant-growth regions (hachured). In figure 3 the important soil regions (in color) are superimposed upon Mulford's plant-growth regions (hachured).

CLIMATES OF GROWTH REGIONS

REGION 1, NORTH PACIFIC COAST

Climate wet, microthermal, with adequate precipitation at all seasons in all portions, except for two areas with a summer deficiency, one extending for 100 miles south of the Oregon-California line, the other extending the same distance north from San Francisco Bay. Between these two areas is a mesothermal area of some 150 miles in north-south extent. Fogs are frequent and winter rainfall is heavy. The lowest temperatures are 22° to 24° F. in the north, to about 32° in the south.

The average annual growing season is from 210 days to less than 90 days in the higher northern portions and more than 240 days in the extreme south. The average annual number of days with snow cover ranges from 1 to 10 over most of the region, increasing to as many as 60 in the central portion.

REGION 2, WILLAMETTE VALLEY-PUGET SOUND

A humid, microthermal climate throughout, with adequate precipitation at all seasons in the north, but with a summer deficiency south of the Columbia River. Summers warmer and drier than those of region 1. Commonest low temperatures range from 10° to 20° F.

The average growing season is 210 days in the south and 150 days in the north. Average annual number of days with snow cover ranges from 1 to 10.

REGION 3, CENTRAL CALIFORNIA VALLEYS

A subhumid, mesothermal climate throughout except for the semiarid to arid southwestern third. Precipitation is deficient in the summer through the northern two-thirds but deficient at all seasons in the semiarid to arid third. Winters mild; lowest temperature 22° to 24° F., with slightly higher temperatures on the hillsides.

Average annual frost-free season more than 240 days. Number of days with snow cover less than 1 annually.

REGION 4, CASCADE-SIERRA NEVADA

A mountainous region where conditions vary with elevation and slope, the eastern side being drier than the western side. Southward the eastern side is decidedly arid; northward less so. The western side varies from wet to humid. Precipitation is adequate at all seasons in the northern portion but deficient in summer from central Oregon southward. The climate is microthermal in the northern portion, varying to mesothermal in the more southern part.

Average annual number of days with snow cover ranges from 10 to 60, increasing with altitude; more than 60 at very high elevations. Average growing season is less than 90 to 150 days, somewhat shorter northward and on the eastern side and decreasing with altitude.

REGION 5, SOUTHERN CALIFORNIA

Climate subhumid, mesothermal, with a summer deficiency of rainfall northward. Southward the climate becomes semiarid with a rainfall deficiency at all seasons.

Average growing season 210 to more than 240 days. Snow cover is rare.

REGION 6, COLUMBIA RIVER VALLEY

In the north subhumid; in the south semiarid; or arid in the southeast corner. A microthermal climate with a deficiency of rainfall at all seasons.

Average annual number of days with snow cover 10 to 60, lowest southward; highest, northward. Average annual growing season, 120 to 150 days.

REGION 7, PALOUSE-BITTERROOT VALLEY

A microthermal climate, varying from semiarid on the extreme west to subhumid in the central portion, humid in the central part of the narrowest portion, and subhumid in the extreme eastern portion. Rainfall deficient at all seasons except in the very center of the area where it is deficient during the summer only.

Average annual number of days with snow cover 10 to 90, the southern half with 10 to 30, but with the number increasing northward. Average annual growing season 180 days in the south to 90 days in the north or at higher elevations.

REGION 8, SNAKE RIVER PLAIN-UTAH VALLEY

Northward generally subhumid, passing to semiarid and arid southward; microthermal and with a deficiency of rainfall at all seasons.

Average annual number of days with snow cover 10 to 30 in the northwestern portion, 30 to 60 most common, especially southward. Average annual frost-free season 90 to more than 180 days, shorter with altitude, longer near large bodies of water and in the northern portion.

REGION 9, GREAT BASIN-INTERMONTANE

Generally semiarid, microthermal, with a deficiency of rainfall at all seasons, but with local arid portions, especially in the southwestern part.

Average annual number of days with snow cover, 30 to 60 in the larger western and southern portions; 60 to 90 days in the northern half of the eastern portion. Average annual frost-free season less than 90 days in the northwestern portion; between 90 and 120 in central and western Nevada, and between 120 and 150 on the east side of the Sierras; in the southernmost portion more than 240 days along the Colorado River, increasingly shorter farther from the river to less than 90 days, depending upon elevation.

REGION 10, SOUTHWESTERN DESERT

Arid, mesothermal, with a deficiency of rainfall at all seasons. Growing season averages more than 240 days annually, locally somewhat less with high altitude.

REGION 11, SOUTHERN PLATEAU

Climate semiarid in the northern and southwestern portions to arid in the south-central and southeastern portions; microthermal in the northern portion, elsewhere mesothermal; rainfall deficient throughout.

Annual number of days with snow cover averages less than 1 in the southern and western portions, but ranges from 10 to 30 in the northern part. Proximity to mountains increases the figure locally. Annual growing seasons range from 90 to 150 days in the north, or with altitude, to more than 240 days in the south.

REGION 12, NORTHERN ROCKY MOUNTAINS

Great variation because of elevation and exposure. Generally subhumid except for the semiarid western extension and extreme eastern and south-central portions; microthermal and with an all-season deficiency of precipitation except in the extreme northwest where rainfall is adequate at all seasons.

Annual number of days with snow cover ranges from 30 to over 120, the number increasing with altitude. Somewhat less in south-central Idaho and the Blue Mountains. Average frost-free season generally less than 90 days; or with decreasing altitude, longer.

REGION 13, CENTRAL ROCKY MOUNTAINS

Climate similar to that of region 12, but temperatures for the same elevation about 7° warmer. Generally arid to semiarid at lower elevations, approaching subhumid to humid climate at higher elevations; microthermal, with rainfall adequacy at all seasons reached with altitude.

Annual number of days with snow cover, 30 to 120, increasing with altitude. Average annual growing season less than 90 days; or at much lower elevations, longer.

REGION 14, SOUTHERN ROCKY MOUNTAINS

Climate similar to that of region 13, but temperatures for the same elevation about 6° warmer. Arid or semiarid at low elevations to subhumid or humid at higher ones; microthermal except for the mesothermal southeastern portion. Precipitation deficient at all seasons except at very high altitudes.

Average annual number of days with snow cover, 10 to 60, increasing with altitude, but fewer southward. Average frost-free season in the western section 210 to less than 120 with altitude; in the eastern section from 180 in the south to less than 90 in the higher parts of the extreme northern portion.

REGION 15, NORTHERN GREAT PLAINS

Except for the subhumid eastern portion and the Black Hills, semiarid throughout; microthermal and with a deficiency of rainfall at all seasons. In the Black Hills, with altitude a humid microthermal climate occurs, with adequate precipitation at all seasons.

Average annual number of days with snow cover 30 to 60 in the south, but 60 to more than 120 over most of the central and northern portions, increasing northward. Average growing season 110 to 120 days in the extreme north, 120 to 150 in the south and southwest, and 90 to 120 in Wyoming, northwestern South Dakota, southwestern North Dakota, and southeastern Montana. Extremely cold in winter, usually −30° to −40° F.

REGION 16, CENTRAL GREAT PLAINS

Climate warmer than that of region 15 and with greater evaporation. Generally semiarid except for the subhumid northeastern and southeastern portions; microthermal in the northern fringe and in the northeastern and southeastern portions, elsewhere mesothermal; precipitation generally deficient at all seasons except in the northeast and southeast where there is a summer deficiency only.

Average annual number of days with snow cover from less than 1 in the extreme southern portion to 30 to 60 in the extreme north. Average growing season 150 days in the north to 210 days in the south.

REGION 17, SOUTHERN PLAINS

Semiarid, except for a small arid area west of the mouth of the Pecos River; mesothermal, with rainfall deficient at all seasons. Average annual growing season 210 to more than 260 days, the longer season southward. Evaporation high throughout.

REGION 18, NORTHERN BLACK SOILS

Subhumid, except for the extreme semiarid northwestern portion; microthermal, rainfall deficient at all seasons. Intermediate in moisture between regions 15 and 21.

Average annual number of days with snow cover from 30 to 60 in the south to over 120 in the north. Average annual growing season 110 to 150 days, or slightly more in the extreme southern portion.

REGION 19, CENTRAL BLACK SOILS

Subhumid throughout; microthermal in the western portions, mesothermal in the eastern; precipitation deficient at all seasons in the northern portion, in summer in the southwestern and west-central portions, but adequate at all seasons in the eastern portion. Sudden variations common in winter; hot winds often blowing in summer; moisture conditions intermediate between those of regions 16 and 22.

Average annual number of days with snow cover from 1 to 10 in the extreme south to 30 to 60 in the extreme north. Average annual frost-free season from 150 days northward to 220 days southward.

REGION 20, SOUTHERN BLACK SOILS

Subhumid and mesothermal throughout; precipitation deficient at all seasons in the northwestern portion, adequate at all seasons in the eastern fringe and southeastern portion. Intermediate in moisture conditions between regions 16, 25, and 29.

Average annual number of days with snow cover, 1 to 10 in the north to less than 1 in the south. Average frost-free season, 220 to more than 260 days, longest southward.

REGION 21, NORTHERN PRAIRIES

Subhumid, microthermal; precipitation deficient at all seasons in the north, changing to adequate at all seasons southward; drying winds and frequent droughts of more than 30 days occur in the western portion.

Average annual number of days with snow cover from 60 to 90 in the south to more than 120 in the north. Average annual frost-free season from 100 days in the north to 160 in the south.

REGION 22, CENTRAL PRAIRIES

Northwestern portion and western fringe subhumid, remaining portions humid; northern portion microthermal, southern mesothermal; precipitation adequate at all seasons throughout.

Average annual number of days with snow cover 30 to 60 except in the southern part of the western portion, where it decreases southward, ranging from 1 to 10. Average growing season 150 to 160 days in the northern portion to 180 in the southeastern portion and 230 in the extreme southwestern portion.

REGION 23, WESTERN GREAT LAKES

Western portion subhumid, eastern portion humid; microthermal; rainfall adequate at all seasons.

Average annual number of days with snow cover, 60 to 90 in the southern and southwestern portions to more than 120 in the northern and northeastern portions. Average annual growing season 100 days in the north to 150 days in the south, or in the southwest, 170 days. Upper Peninsula of Michigan, 110 to 140 days.

REGION 24, CENTRAL GREAT LAKES

Humid, microthermal, with adequate precipitation at all seasons. Winter temperatures more moderate than in region 23.

Average annual number of days with snow cover from 60 to 90 in the southern half, from 90 to 120 in the northern half. Frost-free season averaging 110 days in the north to over 150 in the south longest close to the lakes.

REGION 25, OZARK-OHIO-TENNESSEE RIVER VALLEYS

Humid, mesothermal, with adequate precipitation at all seasons. In the extreme southwestern portion subhumid. Much alternate freezing and thawing in winter.

Average annual number of days with snow cover, 10 to 30 in the north, 1 to 10 in the south. Average annual frost-free season 160 days in the north to 200 in the southeast and 240 in the southwest.

REGION 26, NORTHERN GREAT LAKES-ST. LAWRENCE

Humid, microthermal, with adequate precipitation at all seasons. There are two local portions in northern and southern New York that are wet rather than humid.

Average annual number of days with snow cover, 90 to 120 in the southern portions to more than 120 northward. Average annual growing season less than 100 days in the north and at higher elevations to about 130 in the south.

REGION 27, APPALACHIAN

Northern portion humid, microthermal; southwestern and south-central portions humid, mesothermal. Local areas of wet microthermal climates are distributed along the backbone of the mountains, and there is a wet mesothermal area in the southeastern portion.

Average annual number of days with snow cover 1 to 10 in the extreme southern portion to as much as 90 in the extreme north. In the central portion 30 to 60 days is commonest. Average annual frost-free season 130 days in the north, especially at higher elevations, to 210 days in the extreme southern portion. Throughout, the season is shorter with increasing altitude.

REGION 28, PIEDMONT

Generally humid, mesothermal, but microthermal in the extreme northern portion, with adequate precipitation at all seasons. Warmer than region 27.

Average annual number of days with snow cover 1 to 10, decreasing southward to less than 1, increasing northward from 10 to 30. Average annual growing season from 170 days in the north to 220 or more in the south, longer coastward.

REGION 29, UPPER COASTAL PLAIN

Humid, mesothermal, rainfall adequate at all seasons. Average annual number of days with snow cover less than 1 in the southern half, 1 to 10 in the northern half. Growing season 200 days in the north to 260 days in the south, longer coastward.

REGION 30, SWAMPY COASTAL PLAIN

Humid, mesothermal, with adequate precipitation at all seasons except in the extreme west where it gradually diminishes to a deficiency at all seasons. In central Florida the climate is subhumid, rather than humid.

Average annual frost-free season 230 days in the extreme northeast to more than 260 days in the south-central and southwestern portions. Snow cover rare.

REGION 31, SOUTH CENTRAL FLORIDA

Subhumid, mesothermal, with rainfall adequate at all seasons. Killing frost likely on the average in half the years; frost-free season well over 260 days. Snow cover extremely rare.

REGION 32, SUBTROPICAL FLORIDA

Humid, tropical, with adequate rainfall at all seasons. In the north, killing frosts are apt to occur in half the years; in the south there is no record of a killing frost.

NITROGEN-FIXING BACTERIA

Technicians engaged in planting for erosion control often very wisely choose species that are able, by means of a symbiotic relationship with a species of *Rhizobium* to enrich the soil by the addition of certain nitrogen compounds. With some exceptions, such plants belong to the Leguminosae. Because the soils left after considerable washing has taken place are often poor and unproductive, the incorporation of nitrogen is of great importance in their reclamation. Lespedezas, alfalfa, vetch, clover, acacias, black locust, and Scotch broom are legumes and have been advocated for use particularly on account of their root associations with nitrogen-fixing bacteria.

The decay of various parts of the legume as well as of the root nodules housing the bacteria results in the addition of nitrogen compounds to the soil. Vetch, peas, beans, clover, and other annual plants, or those on which nodules are produced each spring to develop through the season and decay in the autumn enrich the soil to the extent of about 100 pounds of nitrogen per acre annually if the crop is plowed under. In black locust, *Sophora*, some species of *Acacia*, and others, the nodules may last for more than one growing period, and often become woody. Part of the time during the life of the nodules the nitrogenous compounds may be used by the plant.

Not only do members of the Leguminosae form these symbiotic relationships, but they are formed also by shrubs and trees of the genera *Alnus*, *Ceanothus*, *Elaeagnus*, *Shepherdia*, and *Myrica*, besides members of the Cycadaceae and Podocarpaceae. Members of the latter two families will, of course, rarely be used to any great extent in planting in the United States.

The nodules formed in nonleguminous plant roots are by some believed to be caused by species of *Rhizobium*, although this is denied by others. But that the nodules of nonlegumes play a part in the fixation of atmospheric nitrogen very similar to that performed by legume nodules appears to be fairly well established. Cross-inoculation of legumes with strains from *Alnus* and *Elaeagnus* is claimed to have been accomplished successfully, but ordinarily certain strains or races are specific for the host-plant species. Inoculation of planting sites with the proper strain is an established farm practice although the bacteria are probably distributed as wind-borne dust under natural conditions. The rotation of legumes with nonlegumes for soil enrichment is also a common practice. In Taiwan (Formosa), according to R. Kent Beattie, alders are included in the rotation of rice fields in much the same manner, presumably for the benefit derived from the nitrogen-fixing bacteria of the shrub's roots.

In general, plants producing such nodules are able to live in very poor soils, since lack of nitrogen is not as great a factor in their success as it may be for other plants. For this reason the leguminous plants are particularly satisfactory for planting on poor, eroded land, the soil of which will with difficulty support other plants. Many legumes are unsuccessful on acid soils, doing better on neutral or alkaline soils, where calcium appears to be of importance in the nutrition of the bacteria of the nodules. This is not always true, however, as in *Lupinus*.

There are a number of exceptions to the rule that nodule formation caused by *Rhizobium* occurs in all leguminous plants. Those of interest here are *Cercis canadensis*, *Gleditsia triacanthos*, and *Gymnocladus dioica* (*13*). The question at once arises whether these species enrich the soil since they bear no nodules. According to L. T. Leonard, of the Bureau of Plant Industry, as well as other authorities, they probably do not. The synonymity of legumes and nitrogen fixers is by no means certain; possibly there are many more legumes that do not fix nitrogen.

EXPLANATION OF THE LIST

SCOPE

In the alphabetical list are considered all species of woody plants known to grow in the continental United States and on the California islands, with the following exceptions:

1. Plants of the southern, subtropical portion of Florida.
2. In general, species not woody throughout; that is, woody only at the base.
3. Species not native to the United States, unless definitely known to have become naturalized to such an extent as to prove their ability to compete with native species.
4. The cacti, since, as Britton and Schafer (*71*) have said, stem structure is such that no criterion other than size is available to determine which to include as trees or shrubs and which to regard as herbs.[4]
5. Species of parasitic or partially parasitic habit, as *Phoradendron*, *Razoumofskya*, *Pyrularia*, since growing or using them presents difficulties that in effect exclude them from planting programs.
6. Hybrid forms, except for occasional mention under the parent species.

LATIN NAMES AND SYNONYMS

The species making up the list of woody plants have been selected from two sources: (1) Regional and local floras, and (2) monographs of families or genera. But from whatever manual or monograph the names were taken, a decision had to be made regarding the proper name to use, since taxonomists are not always agreed on the correct technical name. Furthermore, manuals published earlier in the century, but still in common use, employ names not in accepted use under the International Code of Botanical Nomenclature. To avoid confusion, all important synonyms are included in the list in their proper alphabetical order with a cross reference to the current preferred name. The species in this list may readily be found, therefore, no matter with what code or manual one may be most familiar.

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[4] Cacti, especially the opuntias, have been used with considerable success in controlling gully heads. The stem sections are simply dumped into the eroding gully, and on taking root they form thickets that contribute materially to the control of the eroding soil. Many species are very important as a source of food and water for desert animals. As some 20 species of mammals and a like number of birds have been observed to eat cacti, their importance to wildlife appears to be considerable.

It might be mentioned that synonyms often show relationships otherwise hidden. As an example: *Vitis helleri*, the roundleaf grape, was first described as a variety of *V. rotundifolia*, the muscadine grape. In the synonymy under *Vitis helleri* one finds *V. rotundifolia* var. *helleri*, which indicates that *V. helleri* is close enough to *V. rotundifolia* to have been considered a variety of it. Other examples could be cited to show the same thing, but this will suffice to indicate that records of utilization by wildlife may often have been applied, especially in earlier days, to both the original species and its variety. Thus 28 species of birds are recorded as having eaten *V. rotundifolia.* None is recorded for *V. helleri.* But that the bird-stomach record should apply partially to the latter species, changed recently from its varietal rank, is fairly certain. In examining plant characterizations, particularly with respect to wildlife foods, technicians will do well to remember the possible interrelationships expressed in the synonymy.

VERNACULAR NAMES OF PLANTS

The problem of choosing vernacular names for species of plants is a difficult one. The very old prejudice against the use of a Latin name is as pronounced as ever, and technicians are universally faced with the necessity of using a so-called "common name" in order to be understood. And yet no exact or careful work can ever be done unless a name is used that applies to one species of plant and no other. The tremendous numbers of vernacular names of plants in common use do not satisfy this requirement. If they could be standardized, as the names of birds have been so that there would be no question of the identity implied by a name, there would be less confusion.

Very laudable attempts to standardize vernacular names have been made, but we are still a great way from completeness. Not the least reason for this is that no committee having the sanction of botanists throughout the country has ever been organized to deal with the matter. If the botanists of the United States were to deal with common names somewhat after the manner in which the botanical congresses have dealt with Latin nomenclature, perhaps in time definite and complete understanding might be achieved.

Standardized Plant Names (*15*) treats horticultural plants for the most part. This and Sudworth's Checklist of the Forest Trees of the United States (*554*) are the best attempts made so far to choose standard vernacular names for woody plants. Although in each there are names that could be much improved, yet by and large the names presented in them have much to recommend them. Many names of woody plants from these two sources have been used in this publication.

A great many names have been taken from Dayton's Important Western Browse Plants (*158*). The various manuals of the flora of different sections of the country have supplied others. A few names have been collected by the author, more notably in the Southwest where, incidentally, a great many plants as well as towns, rivers, and mountains, are called by Mexican or Spanish names.

Nevertheless, there yet remain several hundred species that do not bear distinctive vernacular names. They appear in the list with no other than a Latin name, the author believing that one person is not armed with sufficient authority to coin names for them.

Many species appear under a number of different vernacular names, some of which may also be applied indiscriminately to various other species. In this work the selection of the most descriptive name has been made after careful consideration of the characters of the plant. The common name is placed opposite the Latin name; the remaining synonymous vernacular names may be found in the list of common and scientific names of woody plants (p. 322). The more commonly used vernacular names are there referred to the species that often bears them. Incidentally, this discussion should inform those less familiar with plant names that the use of a common name, where exactitude is desired, is never as satisfactory as the use of the correct Latin name.

RANGE

The user of the woody plant list will find a series of numbers under each species after Range. Each number refers to a plant-growth region shown on Mulford's map (fig. 1). The series of numbers under any given species expresses its approximate geographic range.

To determine the plant-growth regions in which a plant can be planted with most confidence, the geographic range of the particular species was superimposed upon a map of Mulford's growth regions. The numbers were then read off. In many instances a plant may be found growing naturally in only a portion of a growth region, but assuming conditions within a given region to be reasonably constant, the plant is stated to be able to grow anywhere in the entire growth region. For this reason, it is obvious that the actual geographic range of any native species is not necessarily expressed with exactitude.

Interpretation of distribution with respect to the plant-growth regions has been conservative. The range of each species has been checked against records in local floras and published citations of specimens. Where a question exists, the growth region involved has been omitted. The growth regions herein published, therefore, depend in no way upon any belief the author may have that the planting of a given species will probably be safe in adjacent growth regions. If a growth region is listed for a species it has been ascertained that the plant actually does grow there.

Comparison of climatic and soil conditions in one growth region with those in others may point the way to the introduction of a species from one region to another. Here as with other considerations, in this work the facts only are presented; any conclusions drawn from them must be those of the user of the list.

SITE DESIGNATIONS

Plants grow in dry soil, moist soil, or in fresh or well-drained soil. They are to be found in the sun, or in the shade, or in both, or sometimes in half shade. In the list under Site these facts are designated by the single words "dry," "moist," "well-drained," "sun," "shade," and "half shade." Certain species of sagebrush, ordinarily occurring on plains, for instance, would be characterized as "dry, sun." Certain species of osiers, ordinarily growing along streams, would be noted as "Moist, sun." Species of spice-bush, ordinarily occurring in rich woodlands, would be noted as "Well-drained, moist, shade."

Designation of a soil as dry, well-drained, or moist, depends to some extent on the opinion of the worker and the region in which he may be. Dry soil in the Great Plains or Piedmont is presumably much drier than dry soil in New England or western Oregon. Even moist soil might be considered wetter in New England than in Arizona. For this reason, only general designations are placed under each species in the list. Some common sense and a good deal of additional information about a plant may be needed, or further observation of its native habitat, especially when an unusually difficult position is to be its site.

GROWTH HABITS

Woody plants are here considered under growth-habit categories characterized as small shrubs, large shrubs, small trees, large trees, or vines. Small shrubs do not grow higher than 5 feet; large shrubs are 5 feet or more in height; small trees grow to 20 feet; large trees are more than 20 feet in height. The intermingling of such types must be done with care, since taller forms easily overshadow and repress smaller ones.

The habit of a plant may be materially altered by its habitat. Some grapes, for instance, are definitely shrubs on poor, dry soil while on better, more moist soil they may become vines. Certain shrubs become trees if plenty of moisture and good soil is available. Many species that are ordinarily large trees, may be only small ones or large shrubs in poor soils. Some species are shrubby in the northern part of their range and treelike in the southern part, or vice versa. The ability of species to change habit should be considered in planting.

Consideration of the general habit of a plant may assist the technician in selecting species to suit his needs. If he desires a cover on the soil during the winter, he will necessarily choose an evergreen species. If escape cover for wildlife is desired, his choice will be a plant with thorns, dense foliage, or one intricately branched. He may want a species that will permit the growth of herbaceous vegetation beneath it, in which case he will look for a sparsely branched type with thin foliage.

In the list, unless a plant is stated to be evergreen, it is understood to be deciduous. If it is not mentioned as spiny or thorny, it is understood to be free of any sort of spines or thorns. Otherwise characteristics are definitely stated for each plant.

FRUITING

Under each species in the list will be found the designation, "Fruit." Here the kind of fruit is indicated, as pome (applelike), drupe (cherrylike), berry (drupelike but with more than one seed), achene (seedlike), capsule, nut. Immediately after the kind of fruit is designated the time of availability, very often expressed by 2 months, as August–April. The first month indicates when the fruit ripens and is available for collection either by man or wildlife; the second month shows approximately how long the fruit persists on the plant.

The data in this publication concerned with time of availability of fruit must be used with caution. The average dates of ripening of the fruit of a species with a considerable north-south range may have a range of several months, beginning earliest in the south and occurring later in the north. Furthermore, local weather conditions or other factors may delay or hasten the usual period of ripening. Therefore, when fruit is said to be available from August to April, it is meant that this appears to be the usual time. It does not mean that fruit always occurs on a particular bush during all that time. Only local field studies can discover when fruits are usually available in any given region.

Seed collectors know also that fruits particularly attractive to birds may not remain on the plant for any length of time if birds are plentiful. The seeds of *Juniperus ashei*, for instance, ordinarily persist like most other juniper fruits, but in 1936 the ripe fruits in the Ozarks were nearly cleaned off by immense flocks of robins.

PROPAGATION

A work of this sort can hardly deal in detail with methods of propagation, but certain fundamental principles should be stated that may contribute to a better understanding of propagation. Occasional notes indicating usual methods will be found under genera; if methods vary with species, under the species.

In general, propagation of plants from seed produces more vigorous plants. Because of this, plants intended for use on difficult, eroded sites should preferably be grown from seed. Reproduction in this manner involves determination of species and collection, storage, and planting.

Proper collection of good, viable seed demands care and a knowledge of the fruiting period of the plant. Seed falling earliest is usually of poorest quality. In the list of woody plants the date of seed ripening is indicated first, but it may vary considerably from one place to another. In fact, as far as seed collection is concerned, it would be sufficient to say that the fruit of a species ripens in early or late spring, summer, or fall. A seed collector wisely gets to the plants at the earliest date of ripening to be sure that he, instead of birds, squirrels, or other rodents, gets the major share of the crop. Even so, when seed is retained well into the winter, collection may often be deferred until later. But in any event, before seed is collected its soundness and worth should always be determined by cutting tests. The fruit should be mature, as slightly unripe seed has a decidedly poorer keeping quality than fully ripe seed.

Storage of seed depends on the species of plant. Some seed must be sown at once for best results; others must be stratified. Seed with fleshy parts usually must be cleaned by fermentation, washing, and drying before being stored dry. Preservation of the moisture content of seed is of great importance during handling and storing. Some seed, such as that of red and silver maples, willows, and poplars, is killed if the water content drops below 35 percent. Seed of many species of the rose family will germinate readily if planted at once, but if dried will fall into a state of secondary dormancy necessitating stratification to assure germination (*313*). Seed of birches and basswood germinates much more poorly when permitted to dry out after maturity.

Temperature greatly influences the keeping quality of seed (*351*). For most woody plant seed, 35°–40° F. is considered the best temperature. At these levels the moisture content may vary somewhat without harm to the seed. Freezing should be guarded against. Low oxygen content can be obtained by storage in airtight containers; this should be watched, since high oxygen content reduces keeping quality.

"Stratifying," as here used, means placing the seed in layers of peat and holding them at 35°–40° F. or, in specific instances, at the temperature noted in the list under the species. If seed is to be stratified, it should first be treated with a disinfectant. Potassium permanganate in 5 to 10 percent solution is useful for this purpose.

All of these operations and also those that follow are treated admirably in The Modern Nursery (*351*). Seeding and Planting in the Practice of Forestry (*573*) treats particularly of tree species.

Seed may fail to germinate because of incompletely organized embryos or hard seed coats, or because certain internal chemical changes that must take place before germination have not occurred. Additional food in the form of a dilute sugar solution may assist embryo organization during stratification. Seeds with hard seed coats are treated with hot water or agitated with sharp sand to assist them in germinating. Seed requiring a rest period must be stratified in the manner described.

Such of these practices as are known to apply are indicated for each species or genus in the list. In addition, data on the number of seeds per pound, the germination percentage, and the approximate number of usable plants to be expected from each pound of seed are given. These notes are intended to assist the technician in large-scale operations by giving him some idea of the nursery space he may require. Obviously, they can be only approximate.

The number of seeds per pound depends on individual variation in size of seed. This in turn depends on the age and vigor of the plant, the fullness of the crop, differences in site of the individual plants, and place of collection. Trees on good sites produce larger seeds than those on poor ones, and seeds collected at the northern extension of the tree range or from higher elevations are usually smaller than those collected from the southern part of the range or from lower altitudes (*573*). This is probably true also of shrubs.

It can thus be seen that the reported number of seeds per pound may vary tremendously. However, some indication is better than none at all.

Theoretically, the number of seeds per pound multiplied by the percentage of germination should give the number of usable plants to be expected per pound of seed. Actually, this is rarely true. Too many other factors are involved and the number of usable plants is often only one-third to one-fifth or less of the theoretical figure. For several hundred species the actual approximate number of usable plants per pound of seed, determined empirically in the Section of

Nurseries of the Soil Conservation Service, is given, but all figures of this sort must be used with caution.

In large-scale operations, planting stock is most often propagated from seed, but other methods of obtaining plants, such as lifting wild stock, propagation by cuttings, or direct seeding, are all useful. Transplanting wild stock has little to recommend it. It is costly, especially from a labor standpoint, and the percentage of survival is all too often low.

The practice of direct seeding over all or part of a given area would seem to merit more investigation. The elimination of all storage and nursery operations has much appeal, but too little is known of direct seeding either to recommend or to discourage it. Toumey and Korstian (*573*) note that when an area is seeded properly, the cost is usually high. They claim that in direct seeding, as might be expected, germination is usually lower and more uneven than in nurseries. Proper preparation and protection of the site is no small item in the cost. They give a table showing the number of pounds of seed required for planting an acre with each of 23 species of trees, including black cherry, which requires 10 to 25 pounds; black locust, 6 to 8 pounds; white oak, 600 to 800; beech, 50 to 150; and white pine, 5 to 9. Examples of successful direct seeding of woody plants are rare, but with increasing demand for large-scale planting, perhaps methods may be developed to overcome present obstacles. If it is known that direct seeding is successful, the information is included in the present list.

UTILIZATION BY WILDLIFE

The first paragraph under each species after the designation of fruit deals with characters directly or indirectly related to erosion control; the second deals wholly with utilization of the species by wildlife, livestock, and bees. The latter paragraph is divided into two portions headed "*Stomach records*" and "*Observations*."

Under *Stomach records* are placed all records of utilization based on examination of stomach contents. Most of such records are taken from the files of the Bureau of Biological Survey. A few are from identifications of stomach materials made by other agencies.

It has not seemed advisable to name all the species of birds known to have eaten the fruit. The total number of birds utilizing the species of plant is listed, and a statement is added indicating which game birds are included.

Under each genus characterization the paragraph dealing with wildlife utilization lists stomach records and observations in addition to those listed under species. They are not summaries. Identification of plant parts found in stomachs is often possible only as far as the genus. These must hence be recorded only for the genus. The same may be true of observations, where identification is uncertain or possibly inaccurate. Therefore, genus records in this publication are used only because such records cannot be referred to a particular species.

All records of woody-plant utilization known to the author are included. The Biological Survey records, the literature, and many field workers have supplied information for this work. It is, however, very clearly recognized that there may be other records extant, and corrections and additional material are earnestly solicited by the author.

Under *Observations* are placed all records obtained from the literature. These cannot be considered as reliable as stomach records; but as indicated in the section Planting for Wildlife (p. 6), considerable care has been exercised to see that those stated actually do apply to the species under which they are placed. The animals listed under *Stomach records* and *Observations* should not be added to give the total number of animals feeding upon the plant since they are two separate and distinct items, and since the same species of animal may often have been observed to eat a part of the plant as well as to have had a portion of the plant found in its stomach or crop.

LIST OF WOODY PLANTS

Abies spp. **Firs.**

About 23 species of firs are known, of which 10 occur in the United States. All are evergreen forest trees producing soft perishable wood of great importance commercially, and balsamic exudations; the seeds at each end of the cone are usually not fertile; cones break up at maturity; seed germination is usually under 50 percent and viability endures no longer than one season; propagation is entirely by seed sown in spring after stratifying at 32°–41° F.

Stomach records (in addition to specific records): 10 species of birds including dusky and ruffed grouse; elk, Coeur d'Alene chipmunk, black-tailed deer. *Observations* (in addition to the specific records): Four species of birds including spruce and dusky grouse; Fremont pine squirrel, Arizona porcupine.

Abies amabilis (Dougl.) Forbes **Silver fir.**
Picea amabilis Dougl.
Range: 1, 4.
Site: Well-drained, sun.
Fruit: Cone; ripe in September, breaks up in October.

A very large, long-lived evergeen tree; slow growing; susceptible to fire damage because of its thin bark; somewhat attacked by rot; wood of importance commercially, especially as pulp; grows poorly in cultivation; seeds borne heavily every 2 or 3 years, vitality transient, germination low; 11,000 seeds per pound.

Abies arizonica Merr. **Corkbark fir.**
A. lasiocarpa arizonica Lemm.
Range: 13, 14.
Site: Dry, well-drained, sun.
Fruit: Cone, ripe in September.

A large evergreen tree; wood of no importance commercially; good seed years every third year; germination rate low, 25,000–45,000 seeds per pound.
Observations: Porcupine, squirrels, and other rodents.

Abies aromatica, see *Abies grandis.*

Abies balsamea (L.) Mill. **Balsam fir.**
Range: 23, 24, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Cone; ripe in September, breaks up soon afterwards.

A large, fairly rapid-growing evergreen tree with a very shallow root system; intolerant of shade except for the first 6 to 8 years; age limit about 150 years; easily wind-thrown and damaged by fire and rot; short-lived and generally not satisfactory in cultivation; some 10 varieties distinguished in cultivation, one bearing larger cones; wood important for pulp, rarely lumber; seed borne abundantly at intervals of 2 to 4 years, shaded trees generally not bearing; 55,000 seeds per pound, germination 25 percent.

Stomach records: Five species of birds, including spruce and ruffed grouse. *Observations:* Six species of birds including ruffed, spruce and prairie sharp-tailed grouse; porcupine, snowshoe hare; highly important winter food of moose, white-tailed deer; rarely cut for building material, not food, by beaver.

Abies concolor Lindl. and Gord. **White fir.**
A. lowiana (Gord.) Murr., *A concolor lowiana* Lemm.
Range: 4, 5, 9, 10, 11, 12, 13, 14.
Site: Well-drained, sun, shade.
Fruit: Cone; mature in September, soon breaks up.

A very large evergreen tree with a shallow root system; at first rapid growing; later slower; long-lived; resistant to fire, heat, and drought; wood used commercially; good seed years every 2 to 4 years, seed vitality transient; 10,000–15,000 seeds per pound, germination 22–42 percent; five varieties distinguished in cultivation.

Stomach records: Mount Pinos grouse; Inyo chipmunk, black-tailed deer. *Observations:* Sooty grouse; porcupine; of outstanding importance for mule deer, California pine squirrel; much eaten by squirrels and other rodents.

Abies fraseri (Pursh.) Poir. **Southern balsam fir.**
Range: 27.
Site: Well-drained, moist, sun.
Fruit: Cone; mature in September, soons breaks up.

A large evergreen tree, growth rate at first rapid, later slower; wood somewhat used for pulp, rarely lumber; seed produced annually but heavy crops only at long intervals; short-lived both in the wild and in cultivation; 44,000 seeds per pound, germination about 68 percent.

Abies grandis Lindl. **Lowland white fir.**
A. aromatica Raf.
Range: 1, 2, 4, 6, 7, 12.
Site: Well-drained, sun.
Fruit: Cone; mature September–October, soon breaks up.

A very large evergreen tree with a deep root system; rapid growing at first, later slower; long-lived; intolerant of shade; wood of little importance commercially, potentially of greater value; ornamental; seed produced abundantly every 2 or 3 years; 20,000–34,000 seeds per pound, germination about 50 percent.

Stomach records: Plains white-tailed deer. *Observations:* Richardson's pine squirrel.

Abies lasiocarpa (Hook.) Nutt. **Alpine fir.**
Pinus lasiocarpa Hook.
Range: 4, 9 (at higher elevations only), 12, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Cone, mature in September.

A very large evergreen tree; slow growing, moderately long-lived; wood little used commercially; lower branches may root, but new trees seldom develop from them; not successfully cultivated in the Eastern States; seed produced abundantly every 3 years; seed vitality transient; 50,000 seeds per pound, germination 24 percent; about 5,000 usable plants per pound of seed.

Stomach records: Three species of birds, including Richardson's grouse; mountain sheep, black-tailed deer. *Observations:* Cascade pine squirrel.

Abies lowiana, see *Abies concolor.*

Abies magnifica Murr. **California red fir.**
Range: 4.
Site: Well-drained, sun.
Fruit: Cone; mature in August, breaks up in September.

A very large evergreen tree; slow growing, especially with age; long-lived; intolerant of shade, but more resistant with age; ornamental; wood little used commercially, potentially of greater use; good seed crops produced every 2 or 3 years; seed vitality transient; 67,000 seeds per pound.

Observations: Sooty grouse, California pine grosbeak; of slight importance for mule deer.

Var. *shastensis* Lemmon, Shasta red fir; very similar to the species and occurring within its range, but less common.

Abies nobilis Lindl. **Noble fir.**
Range: 1, 4.
Site: Well-drained, sun.
Fruit: Cone; ripe in September, begins to break up by October.

A very large evergreen tree with a shallow or deep root system; long-lived, fairly rapid growing; intolerant of shade; easily fire-damaged because of its thin bark; insect damage very rare; wood little used commercially, potentially of greater value; does well in cultivation in the Eastern States; good seed years infrequent and at long intervals; vitality of seed transient; 16,000 seeds per pound, germination 40–50 percent.

Abies venusta (Dougl.) Koch. **Bristlecone fir.**
Pinus venusta Dougl.
Range: 5.
Site: Well-drained, sun, shade.
Fruit: Cone; ripe in August, breaks up in September.

A large evergreen tree not used commercially; seed produced abundantly at intervals of 3 to 5 or more years, of low and transient vitality.

Abutilon newberryi, see *Horsfordia newberryi*

Acacia spp.

Some 450 species are known, most of them tropical; majority rapid growing and short-lived; propagation is by seeds or cuttings from half-ripe wood taken with a heel; the seeds are treated with hot water and sown in March or April.

Stomach records (in addition to specific records): Mearn's quail. *Observations* (in addition to specific records): Texas antelope squirrel, cedar-belt cottontail.

Acacia amentacea DC. **Blackbrush.**
Acaciopsis amentacea (DC.) Britt. and Rose.
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Legume.

A large shrub to small tree, bearing spines; often found on sandy or other soils.

Acacia angustissima (Mill.) Kuntze. **Prairie acacia.**
Mimosa angustissima Mill., *M. filiculoides* (Cav.) Trel., *A. filicina* Willd., *A. filiculoides* Trel., *A. hirta* (Nutt.) Robins., *Acaciella hirta* (Nutt.) Britt. and Rose., *Acaciella filiculoides* (Cav.) Britt. and Rose.
Range: 11, 16, 17, 20, 22, 25, 30.
Site: Dry, well-drained, sun.
Fruit: Legume, available July–August.

A small to usually large shrub or rarely a small tree; unarmed; blooms May–July and often grows in sandy and other soils.

Stomach records: Masked bobwhite. Somewhat browsed, pods relished by cattle and horses.

Acacia berlandieri Benth. **Guajillo.**
Senegalia berlandieri (Benth.) Britt. and Rose.
Range: 11, 16, 17.
Site: Dry, sun.
Fruit: Legume, available June–July.

A small to large spiny shrub, occasionally unarmed; flowers November–March; root system very deep; wood used for fuel locally; an important source of honey.

Acacia constricta Benth. **Mescat acacia.**
Acaciopsis constricta (Benth.) Britt. and Rose.
Range: 10, 11, 14, 16, 17.
Site: Dry, sun.
Fruit: Legume, available July–September.

A small to large, spiny shrub, often with sticky foilage, adapted to a wide range of soil conditions but often found in sand; seed germination about 45 percent; about 400 usable plants per pound of seed.

Var. *paucispina* Woot. and Standl., is a larger and less spiny form usually found at higher elevations than the species.

Stomach records: Masked bobwhite, Gambel quail. *Observations:* Jack rabbit. Inferior to worthless forage for livestock, except that pods are taken. A source of honey.

Acacia cuspidata Schlecht.
Range: 11.
Site: Dry, sun.
Fruit: Legume, available in June.

Acacia emoryana Benth.
Senegalia emoryana (Benth.) Britt. and Rose.
Range: 17.
Site: Well-drained, sun.
Fruit: Legume, available in July.

A large shrub to small or large tree, unarmed, or with few prickles; flowers in March.

Acacia farnesiana (L.) Willd. **Huisache.**
Mimosa farnesiana L., *Vachellia farnesiana* (L.). Wight and Arnott..
Range: 5, 10, 11, 17, 20, 29, 30.
Site: Dry, sun.
Fruit: Legume, available July–August.

A small shrub to large tree, depending on the degree of moisture; spiny; flowers February–March; will withstand several degrees of frost; drought and heat-resistant; wood very durable, used commercially; very common and ornamental in cultivation; naturalized from the Gulf coast region to southern California; seed germination about 30 percent.

Considered a valuable stock forage, especially in winter; said to impart a bad flavor to cattle flesh. An important honey plant.

Acacia filicina, see *Acacia angustissima.*

Acacia filiculoides, see *Acacia angustissima.*

Acacia flexicaulis, see *Pithecolobium flexicaule.*

Acacia greggii Gray. **Long-flowered catclaw.**
Senegalia greggii (Gray) Britt. and Rose.
Range: 5, 9, 10, 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Legume, available July–spring.

A small to large shrub or small tree, short-spined, straggling, and thicket forming; flowers April–October; very drought resistant; wood very durable, used locally; furnishes a gum similar to gum arabic; seed germination about 60 percent; about 200 usable plants per pound of seed.

Stomach records: Gambel quail. *Observations*: Sometimes used as roosts by Gambel quail and a favorite hiding place for jack rabbits and other animals; eaten by jack rabbits especially in drier seasons. A useful bee plant; furnishes much browse to livestock on depleted range; less used on range covered with good stand of grass; pods of low palatability to livestock; when of tree habit much value for shade; withstands heavy grazing.

Acacia hirta, see *Acacia angustisssima.*

Acacia lemmonii Rose. **Lemmon acacia.**
Acaciella lemmonii (Rose) Britt. and Rose.
Range: 10, 11.
Site: Dry, sun.
Fruit: Legume, ripe in September.

A small shrub, browsed to some extent; pods relished by cattle and horses.

Acacia millefolia Wats.
Range: 10.
Site: Dry, sun.
Fruit: Legume.

A large, short-spined shrub.

Acacia pulverulenta, see *Leucaena pulverulenta.*

Acacia reticulata Willd. **Netvein acacia.**
Range: 11.
Site: Dry, sun.
Fruit: Legume.

A small shrub, considered good browse for cattle.

Acacia roemeriana Scheele. **Round-flowered catclaw.**
Senegalia roemeriana (Scheele) Britt. and Rose.
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Legume.

A small to large, spiny shrub, generally rather stout.
Stomach records: Scaled quail. *Observations:* Sonora deer. Considered a valuable honey plant in western Texas.

Acacia subtortuosa, see *Acacia tortuosa.*

Acacia tortuosa (L.) Willd. **Catclaw.**
A. subtortuosa Shafer, *Popanax tortuosa* (L.) Raf., *P. schaffneri* (Wats.) Britt. and Rose.
Range: 11, 17, 20.
Site: Dry, sun.
Fruit: Legume.
A small shrub to small tree; spiny; blooms in March.

Acacia vernicosa Standl.
Acaciopsis vernicosa (Standl.) Britt. and Rose.
Range: 11.
Site: Dry, sun.
Fruit: Legume.
A small to rarely large shrub.
Stomach records: Scaled quail.

Acacia wrightii Benth. **Texas catclaw.**
Senegalia wrightii (Benth.) Britt. and Rose.
Range: 10, 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Legume, ripe June–September.
A large shrub to small or large tree; short-spined and with dense foliage; blooms March–May; wood used locally for fuel. A good honey plant.

Acaciella filicoides, see *Acacia angustissima.*

Acaciella hirta, see *Acacia angustissima.*

Acaciella lemmonii, see *Acacia lemmonii.*

Acaciopsis amentacea, see *Acacia amentacea.*

Acaciopsis constricta, see *Acacia constricta.*

Acaciopsis vernicosa, see *Acacia vernicosa.*

Acalypha californica Benth. **California copperleaf.**
Range: 5.
Site: Dry, sun.
Fruit: Capsule.
A small monoecious shrub.

Acalypha pringlei Wats.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small shrub.

Acamptopappus microcephalus, see *Aplopappus cooperi.*

Acamptopappus sphaerocephalus (Harv. and Gray) Gray.
Range: 10.
Site: Dry, sun.
Fruit: Achene.
A small, many-stemmed shrub.

Acamptopappus schockleyi Gray.
Range: 10.
Site: Dry, sun.
Fruit: Achene.
A small shrub.

Acer spp. **Maples.**
About 110 species of trees or shrubs, of which 12 occur in the United States; many in cultivation; most with fine autumn coloration; the majority grow in neutral soil; propagation by seeds sown as soon as ripe, or stratified at 41° F. and sown in spring; vitality of seeds transient.
Stomach records (in addition to specific records): White-tailed deer, opossum. *Observations* (in addition to specific records): Thirteen species of birds; an

emergency food of pinnated grouse; brown mountain beaver, fox squirrel, moose; species other than *A. pennsylvanicum* and *A. spicatum* (q. v.) in times of necessity are cut for food and building materials by beaver. Eaten to some extent by muskrat. The western species furnish good browse for livestock.

Acer barbatum, see *Acer saccharum.*

Acer bernardinum, see *Acer glabrum.*

Acer brachypterum, see *Acer floridanum.*

Acer californicum, see *Acer negundo.*

Acer circinatum Pursh. **Vine maple.**
Range: 1, 2, 4.
Site: Well-drained, moist, sun, shade.
Fruit: Samara, available in September.

A large shrub to a small or rarely large tree; branches commonly rest on the ground, where they may root; slow growing, lives 80 to 90 years; wood used to some extent locally; will not furnish maple sugar; about 5,000 seeds per pound.

Observations: Considered to rank with *A. macrophyllum* as third in importance as browse for Olympic wapiti; Pacific mountain beaver. Of some importance as livestock browse.

Acer dasycarpum, see *Acer saccharinum.*

Acer douglasii, see *Acer glabrum.*

Acer floridanum (Chapm.) Pax. **Southern sugar maple.**
A. saccharinum floridanum Chapm., *Saccharodendron floridanum* (Chapm.) Nieuwl.
Range: 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Samara.

A large tree closely related to *A. saccharum.*

Var. *villipes* Rehder (*A. brachypterum* Woot. and Standl.), occurs also in region 11.

Acer glabrum Torr. **Dwarf maple.**
A. tripartitum Nutt., *A. bernardinum* Abrams, *A. neomexicanum* Greene.
Range: 4, 9, 12, 13, 14, 15.
Site: Dry, well-drained, sun.
Fruit: Samara; available in late autumn.

Rarely a large shrub, commonly a small to large tree; usually dioecious and growing in poor soils; 13,000–20,000 seeds per pound.

Var. *douglasii* (Hook.) Dippel, (*A. douglasii* Hook.) occurs with the species in regions 4 and 12.

Stomach records: Mountain sheep, plains white-tailed deer. *Observations:* Fair browse for mule deer.

Acer grandidentatum Nutt. **Bigtooth maple.**
A. saccharum grandidentatum (Nutt.) Sudw.
Range: 7, 8, 9, 11, 12, 13, 14, 16, 19.
Site: Well-drained, sun.
Fruit: Samara; available in September.

A large shrub to large tree; flowers April–May.

Acer interior, see *Acer negundo.*

Acer kingii, see *Acer negundo.*

Acer leucoderme Small. **Whitebark maple.**
Saccharodendron leucoderme (Small) Nieuwl.
Range: 28, 29.
Site: Dry, well-drained, shade.
Fruit: Samara, available in September.

A large shrub to small or large tree often with a crooked trunk; flowers in April.

Acer macrophyllum Pursh. **Bigleaf maple.**
Range: 1, 2, 3, 4, 5.
Site: Well-drained, moist, sun, shade.
Fruit: Samara, available July–September or persistent until winter.

A large tree; usually occurs only on good soils; root system shallow; long-lived; wood strong, not durable, much used commercially; not successfully cultivated in the eastern United States; will produce maple sugar in nearly exactly as good quality and as great quantity as the eastern sugar maple; 2,700 seeds per pound, germination 90 percent, about 2,000 usuable plants per pound of seed. *Observations:* Western evening grosbeak; listed with the vine maple as third in importance as browse for Olympic wapiti; California mule deer.

Acer negundo L. **Boxelder.**
Negundo negundo (L.) Karst., *Rulac negundo* Small, *Negundo aceroides* Moench.
Range: 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Samara, available September–October and persistent until spring.

A large shrub, or more commonly, a small to large tree; dioecious; root system generally shallow, deeper in deep soils; rapid growing; short-lived; easily storm-damaged, injured by heart rot, fire, and insects; wood soft, weak, used commercially; shoots appear on exposed or injured roots; 10,000–14,000 seeds per pound, germination 40–60 percent; about 2,000 usable plants per pound of seed; easily transplanted when young.

The justification for separating this species from the genus *Acer* and placing it in a separate genus, *Negundo*, is very good. The species is placed here merely for convenience but further study will very likely show this species to be generically different from the maples.

Var. *violaceum* Kirchner. (*Negundo nuttallii* (Nieuwl.) Rydb., *Rulac nuttallii* Nieuwl.) occurs in regions 8, 15, 18, 21, 22, 23, 24, and 27.

Var. *texanum* Pax. (*Rulac texana* (Pax) Small, *Acer texanum* Pax, *Negundo texanum* (Pax) Rydb.) occurs in regions 19, 20, 25, and 29.

Var. *interius* (Britt.) Sarg. (*Acer interior* Britt., *Rulac interior* (Britt.) Nieuwl., *Negundo interius* (Britt.) Rydb., A *kingii* Britt.) occurs in regions 8, 9, 11, 12, 13, 14, and 22.

Var. *arizonicum* Sarg. occurs in region 11.

Var. *californicum* (Torr. and Gray) Sarg. (*Negundo californicum* Torr. and Gray, *Acer californicum* Dietr., *Negundo aceroides californicum* Sarg., *Rulac californicum* (Torr. and Gray) Nieuwl.) occurs in regions 3, 4, and 5.

Observations: Four species of birds, including ring-necked pheasant; fox squirrels; many additional squirrels and birds; California mule deer.

Acer neomexicanum, see *Acer glabrum.*

Acer nigrum Michx. f. **Black maple.**
A. saccharum nigrum (Michx. f.) Small, *Saccharodendron nigrum* (Michx. f.) Small, *A. barbatum nigrum* Sarg.
Range: 21, 22, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Samara, available in September.

A large tree, resembling and very closely related to *A. saccharum*, and intergrading with it; often considered with good reason merely a variety of the sugar maple; grows in rich soils; wood of importance commercially; produces maple sugar.

Wildlife records for the sugar maple may apply equally well to this species.

Acer pennsylvanicum L. **Striped maple.**
Range: 21, 23, 24, 26, 27.
Site: Well-drained, moist, shade.
Fruit: Samara, available in September.

A large shrub to small or large tree, usually found in acid soil; wood sometimes used commercially.

Observations: Cottontail rabbit; beaver food where *Populus* is lacking; moose, white-tailed deer.

Acer rubrum L. **Red maple.**
Rufacer rubrum (L.) Small, *A. stenocarpum* Britt. and Shafner.
Range: 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Samara, available March–April.

A large dioecious or monoecious tree; occurs on a variety of soils; root system shallow on moist sites, deeper on dry sites; rapid growing, short-lived; not seriously injured by insects but subject to heart rot; severely injured by fire;

coppices freely, especially when young; very brilliant red in autumn; wood much used commercially; 18,000 seeds per pound, germination 70 percent, about 2,000 usable plants per pound of seed; vitality of seeds transient; easily transplanted. Several varieties have been described, all occurring within the range of the species.

Stomach records: Palm warbler; eastern chipmunk, white-tailed deer. *Observations* Ten species of birds; cottontail rabbit; considered the fifth most important winter food of white-tailed deer in Massachusetts.

Acer saccharinum L. **Silver maple.**
A. dasycarpum Ehrh., *Argentacer saccharinum* (L.) Small.
Range: 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Samara, available April–June.

A large monoecious or dioecious tree; taproot small, lateral roots well developed; grows in a variety of soils; at first rapid growing, later slower; short-lived; much subject to fungus diseases; wind-firm, but easily storm-damaged; easily damaged by fire; coppices freely when young; grows successfully on coal-stripped land in Illinois; wood hard, strong, not durable, of importance commercially; much cultivated, with some six outstanding varieties known; seed vitality transient; about 2,400 seeds per pound, germination 50 percent, about 400 usable plants per pound of seed.

Stomach records: Gray eastern chipmunk, eastern chipmunk. *Observations:* Four species of birds; cottontail rabbit, snowshoe hare, red squirrel, white-tailed deer.

Acer saccharum Marsh. **Sugar maple.**
A. barbatum (Michx.) Nieuwl., *Saccharodendron barbatum* (Michx.) Nieuwl.
Range: 15, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Samara, available July–December.

A large monoecious or dioecious tree; usually occurs on rich soil; root system shallow, wide spreading; slow growing, long-lived; seriously injured by fire; wind-firm; attacked by numerous insects; wood hard, strong, not very durable, much used commercially; produces maple sugar; easily transplanted when small; 7,000 seeds per pound, germination 50–60 percent, about 1,500 usable plants per pound of seed.

Four varieties are listed, varying among other things in the amount of hairiness of the leaves. All occur within the range of the species except var. *sinuosum* (Rehd.) Sarg., (*A. sinuosum Rehd.*), which occurs in regions 17 and 20.

Stomach records: White-tailed deer. *Observations:* Four species of birds including ring-necked pheasant; porcupine, red squirrel, cottontail rabbit; heavily utilized by moose on Isle Royale; white-tailed deer.

Acer sinuosum, see *Acer saccharum.*

Acer spicatum Lam. **Mountain maple.**
Range: 23, 24, 26, 27.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Samara, available August–November.

A large shrub to small or large tree; ordinarily occurs on acid soil; clump forming; wood used to some extent commercially.

Stomach records: White-tailed deer. *Observations:* Cottontail rabbit, moose; beaver, where *Populus* is lacking.

Acer stenocarpum, see *Acer rubrum.*

Acer texanum, see *Acer negundo.*

Acer tripartitum, see *Acer glabrum.*

Adelia acuminata, see *Forestiera acuminata.*

Adelia angustifolia, see *Forestiera angustifolia.*

Adelia ligustrina, see *Forestiera ligustrina.*

Adelia neomexicana, see *Forestiera neomexicana.*

Adelia parvifolia, see *Forestiera neomexicana.*

Adelia pubescens, see *Forestiera pubescens.*

Adelia vaseyi, see *Ricinella vaseyi.*

Adenostoma fasciculatum Hook. and Arn. **Chamiso.**
Range: 5.
Site: Dry, sun.
Fruit: Achene.

A large, spreading shrub with small fasicled leaves; branches very close to the ground, and stems are practically without permanent branches; produces little shade and does not protect the ground from hot or dry winds; very inflammable; colony forming; root system consists of deep taproot and well developed laterals; heavy root crown developed, which when large enough enables plant to survive fire; common chaparral dominant on dry slopes and ridges, invading and occupying burns quickly; generally regarded as a pest; worthless on the range; propagation by seeds or green-wood cuttings taken in spring.

Observations: California mule deer.

Adenostoma sparsifolium Torr. **Shankbush.**
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A large, very inflammable shrub; flowers July–August; propagated by seeds or green-wood cuttings taken in spring. Of no value as stock forage.

Observations: California mule deer.

Adolphia californica Wats.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small to large, spiny shrub without forage value; generally considered a local range pest.

Adolphia infesta (H. B. K.) Meisn.
Ceanothus infesta H. B. K., *Colletia multiflora* DC.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Drupe.

A small to large, extremely spiny, densely branched shrub without forage value.

Aesculus spp. **Buckeyes.**

Most species grow in neutral soil; propagation is by seed sown in the fall or, after stratifying, in the spring.

Aesculus arguta, see *Aesculus glabra.*

Aesculus austrina, see *Aesculus discolor.*

Aesculus californica (Spach) Nutt. **California buckeye.**
Range: 1, 3, 4, 5.
Site: Dry, well-drained, sun.
Fruit: Capsule, available September–October.

A large shrub to small or rarely large tree; very broad-headed; coppices freely when cut; foliage early burning brown, falling or persistent; very ornamental, flowers during May–August; wood used for fuel to some extent; reputed to be very durable for fence posts.

Observations: Redwood chipmunk, many squirrels; dead leaves fair forage for mule deer. Poisonous to stock; not eaten by swine; bees poisoned by the nectar.

Aesculus discolor Pursh. **Woolly buckeye.**
Range: 16, 17, 20, 29, 30.
Site: Well-drained, sun.
Fruit: Capsule; available in October, seeds fall at once.

A large shrub to a small or rarely large tree, ordinarily growing in rich soil; flowers April–June.

Var. *mollis* (Raf.) Sarg., (*A. austrina* Small) the scarlet buckeye, is a small tree with red flowers, occurring within the range of the species.

Aesculus flava, see *Aesculus octandra.*

Aesculus georgiana, see *Aesculus neglecta.*

Aesculus glabra Willd. **Ohio buckeye.**
Range: 22, 24, 25, 27, 29.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule, available in September.

A large, rapid-growing tree; flowers April–May; short-lived; wood sometimes used commercially; flowers not showy. Young shoots poisonous to cattle and if forage is poor in spring cattle will eat them; later not attractive to livestock; hogs poisoned by the seeds.

Several varieties have been described, a white-barked form, one with more pubescent leaves, and one with more leaflets. All are of more or less local occurrence within the range of the species except var. *arguta* (Buckl.) Robinson, (*A. arguta* Buckl.), the shrubby buckeye, found also in region 30.

Aesculus humilis, see *Aesculus neglecta.*

Aesculus michauxii, see *Aesculus neglecta.*

Aesculus neglecta Lindl.
Range: 28.
Site: Well-drained, sun.
Fruit: Capsule, available in September.

A large, very rare tree; flowers April–May.

Var. *georgiana* Sarg. (*A. georgiana* Sarg.) Georgia buckeye; usually shrubby; occurs in regions 28, 29, and 30.

Var. *tomentosa* Sarg. (*A. michauxii* Hort., not Spach, *A. humilis* Hort., not Lindl., *A. rubra carnea superba* Hort., and *A. rubra carnea pubescens* Hort.) in region 28 has very showy flowers.

Aesculus octandra Marsh. **Yellow buckeye.**
A. flava Ait.
Range: 20, 22, 23, 24, 25, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Capsule, available in September.

A large shrub to small or large tree; root system shallow; rapid growing, short-lived; wood used commercially; subject to dry rot and stem borers; blooms April–May; a red-flowered form is known.

Aesculus parviflora Walt. **Bottlebrush buckeye.**
Range: 29, 30.
Site: Well-drained, shade.
Fruit: Capsule, available in October.

A large spreading shrub, very showy during the July flowering period; commonly occurs on rich soil.

Aesculus pavia L. **Red buckeye.**
Range: 20, 25, 27, 28, 29, 30.
Site: Moist, shade.
Fruit: Capsule, available in September.

A large shrub to small or rarely large tree; ordinarily occurs on slightly acid soil; flowers April–May; very handsome in cultivation; a form with dark-red flowers is known. Poisonous to livestock.

Aesculus rubra vars., see *Aesculus neglecta.*

Ailanthus altissima (Mill.) Swingle. **Ailanthus.**
A. glandulosa Desf.
Range: 1, 2, 3, 5, 6, 8, 11, 17, 20, 22, 24, 25, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Samara; ripe in September, long persistent.

A large tree introduced from China but aggressively spontaneous and well-established in the range indicated; easily storm-damaged; rapid growing; coppices freely; immune to the effects of smoke, dust, or insect pests; 14,000–22,000 seeds per pound, germination 60 percent, about 3,000 usable plants per pound of seed; withstands considerable abuse in handling; staminate plant odoriferous in flower. This species produces wood even on poor soil more than twice as fast as any native tree having wood of anything like the same fuel value; wood ranked with that of black walnut or oak for fuel, excellent for cabinetmaking.

Observations: Pine grosbeak, crossbill; white-tailed deer.

Ailanthus glandulosa, see *Ailanthus altissima.*

Albizzia julubrissin Duraz. **Silktree.**
Range: 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Legume, available September–November.

A large tree introduced from Asia and Africa; 11,000 seeds per pound, 3,000 usable plants per pound of seed.

Alhagi camelorum Fisch. **Camelthorn.**
Range: 10, 11.
Site: Dry, well-drained, sun.
Fruit: Legume, available August–September.

A small, spiny shrub naturalized from Asia Minor; rapid growing; aggressive and thicket forming; root system deep and extensive; eradication operations for this species have been in progress.

Allenrolfea occidentalis (Wats.) Kuntze. **Inkweed.**
Spirostachys occidentalis Wats.
Range: 8, 9, 10, 11, 16.
Site: Well-drained, moist, sun.
Fruit: Achenelike.

A small to large, succulent, almost leafless shrub, usually confined to and an indicator of alkaline soil. Sparingly eaten by livestock.

Alnus spp. **Alders.**

Generally rapid growing; commonly occurring in neutral soil; wood durable in water; nitrogen-fixing bacteria form nodules on the roots of alder in somewhat the same manner as on the legumes; propagated by seeds sown in fall or spring; or in the shrubby species, by hard-wood cuttings and layers.

Stomach records (in addition to specific records): 20 species of birds, including sharp-tailed grouse, ruffed grouse, bobwhite, woodcock, and ptarmigan. Composed 2.5 percent of the food of northern sharp-tailed grouse in winter in Quebec and Ontario; Illinois skunk, opossum. *Observations* (in addition to specific records): Sixteen species of birds; an emergency food of prairie sharp-tailed grouse, northern sharp-tailed grouse; snowshoe hare, Pacific mountain beaver, brown mountain beaver, porcupine, Olympic wapiti; beaver, where *Populus* is lacking; moose, white-tailed deer. Palatability to livestock not high but considered an important secondary forage, especially for cattle. A source of pollen for bees.

Alnus alnobetula, see *Alnus crispa.*

Alnus crispa (Ait.) Pursh. **Green alder.**
A. alnobetula of Amer. auth., not Koch.
Range: 26, 27.
Site: Dry, well-drained, moist, sun.
Fruit: Nutlet, borne in a cone.

A large shrub with somewhat decumbent branches.

Var. *mollis* (Fern.) Rehd., (*A. mollis* Fern.) is a small tree occurring in regions 23, 24, 26, and 27.

Observations: Redpoll; an important summer browse of moose on Isle Royale.

Alnus fruticosa, see *Alnus sinuata.*

Alnus glutinosa (L.) Gaertn. **European black alder.**
A. vulgaris Hill, *A. rotundifolia* Mill.
Range: 26, 27.
Site: Well-drained, sun.
Fruit: Nutlet, borne in a cone.

A small tree introduced from Europe, with many varieties known in cultivation; about 10,000 usable plants per pound of seed.

Observations: Much eaten by ruffed grouse in New York.

Alnus incana (L.) Moench. **Speckled alder.**
Range: 21, 22, 23, 24, 26, 27.
Site: Well-drained, moist, sun, shade.
Fruit: Nutlet, borne in a cone, available August–September.

A large shrub to small tree with very thick and dense foliage; rapid growing; thicket forming; a naturally occurring stream-bank protector; 256,000–625,000 seeds per pound, about 10,000 usable plants per pound of seed; easily transplanted.

Stomach records: Three species of birds, including ptarmigan and sharp-tailed grouse; muskrat. *Observations:* Redpoll; cottontail rabbit; ignored by deer in Massachusetts; summer but not winter food of moose on Isle Royale; casually browsed by northern white-tailed deer.

Alnus maritima (Marsh.) Muhl. **Seaside alder.**
Range: 25, 28.
Site: Well-drained, moist, sun.
Fruit: Nutlet, borne in a cone, available October–November.

A large shrub to small or large tree; sometimes forms thickets.

Alnus mollis, see *Alnus crispa.*

Alnus oblongifolia Torr. **Mexican alder.**
Range: 11, 14.
Site: Well-drained, sun.
Fruit: Nutlet, borne in a cone.

A small to large tree; usually occurs at higher elevations.

Alnus occidentalis, see *Alnus tenuifolia.*

Alnus oregona, see *Alnus rubra.*

Alnus rhombifolia Nutt. **White alder.**
Range: 1, 3, 4, 5, 6, 7, 8, 10, 12.
Site: Moist, shade.
Fruit: Nutlet, borne in a cone that remains until spring.

A large tree, often thicket forming; wood rots quickly in soil and is of very little value commercially.

Observations: Of slight importance as food for mule deer.

Alnus rotundifolia, see *Alnus glutinosa.*

Alnus rubra Bong. **Red alder.**
A. oregona Nutt.
Range: 1, 2, 5, 6.
Site: Well-drained, moist, sun, shade.
Fruit: Nutlet, borne in a cone; seeds shed in autumn, cones persistent.

A large tree; rapid growing, especially the first 10 to 15 years; short-lived; root system shallow, superficial; wood of increasing value commercially; 363,000 seeds per pound, germination 40 percent; about 10,000 usable plants per pound of seed.

Stomach records: Four species of birds; California mule deer. *Observations:* Pine siskin. Fair browse for cattle and sheep.

Alnus rugosa (Du Roi) Spreng. **Smooth alder.**
A. serrulata Willd.
Range: 20, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Well-drained, moist, sun.
Fruit: Nutlet, borne in a cone.

A large, thicket-forming shrub with very thick foliage; 400,000 seeds per pound, about 40,000 usable plants per pound of seed.

Observations: Four species of birds, including mourning dove; white-tailed deer.

Alnus serrulata, see *Alnus rugosa.*

Alnus sinuata (Regel) Rydb. **Sitka alder.**
A. viridis sinuata Regel., *A. sitchensis* Sarg., *A. fruticosa* auths. not Rupr.
Range: 2, 4, 6, 7, 12.
Site: Moist, sun.
Fruit: Nutlet, borne in a cone.

A small to large shrub, or northward a small to large tree. Considered fair browse for sheep.

Alnus sitchensis, see *Alnus sinuata.*

Alnus tenuifolia Nutt. **Mountain alder.**
A. occidentalis Dippel.
Range: 4, 7, 11, 12, 13, 14.
Site: Well-drained, moist, sun.
Fruit: Nutlet, borne in a cone.

A large, thicket-forming shrub to small or large trees; about 10,000 usable plants per pound of seed.

Observations: Captive Columbian sharp-tailed grouse; of slight importance for mule deer. A fair sheep browse of high palatability.

Alnus vulgaris, see *Alnus glutinosa.*

Aloysia ligustrina, see *Lippia ligustrina.*

Amarolea americana, see *Osmanthus americana.*

Amelanchier spp. **Serviceberries.**

Between 20–25 species are known, most of them occurring in North America; in slightly acid soil; many are very closely related and often difficult to distinguish; very ornamental; generally irregular in time of ripening of the berries; propagated by seeds sown as soon as ripe or in the spring after stratifying 90 days at 32°–50° F., or the stoloniferous types by suckers; seedlings should remain in seedbeds 3 to 4 years before planting in the field. All are alternate hosts for the cedar apple fungus.

Stomach records (in addition to specific records): 36 species of birds, including ruffed grouse, dusky grouse, turkey; composed 0.16 percent of vegetable food of eastern skunk in Michigan; gray-tailed chipmunk, gray-necked chipmunk, golden-mantled marmot, black-tailed deer, white-tailed deer; mountain sheep. *Observations* (in addition to specific records): Eighteen species of birds, including mountain quail, dusky grouse, and prairie sharp-tailed grouse; skunk; heavily browsed by moose; of first importance for red fox; golden-mantled ground squirrel, Arizona chipmunk, Say chipmunk, Wasatch chipmunk; favorite food of pale chipmunk; raccoon, black bear, cottontail rabbit, pica, beaver; an important food of white-tailed deer.

Amelanchier alnifolia Nutt. **Western serviceberry.**
A. oreophila Nels.
Range: 4, 10, 11, 12, 13, 14, 15, 18, 19, 21, 23, 24, 26.
Site: Dry, well-drained, moist, sun.
Fruit: Pome, available July–September.

A large shrub to small tree or rarely a large tree with a deep and spreading root system; blooms April–June; very variable, and the complex of forms not yet clear botanically. Among others, var. *pallida* (Greene) Jeps. (*A. pallida* Greene), var. *venulosa* (Greene) Jeps. (*A. venulosa* Greene), var. *covillei* (Greene) Jeps. (*A. covillei* Standl.) and var. *cuyamacensis* Munz, have been described.

Stomach records: Six species of birds, including sooty grouse, Richardson's grouse; plains white-tailed deer, Bitterroot valley chipmunk, black-tailed deer. *Observations:* Mountain quail, captive Columbian sharp-tailed grouse, blue grouse; California mule deer. A forage species of the first rank; younger foilage more palatable; of great importance to stock on the range.

Amelanchier amabilis Wieg.
A. sanguinea grandiflora Rehd.
Range: 24, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Pome, available July–August.

A small to large shrub, heretofore probably confused with *A. sanguinea.* Probably a calciphile.

Amelanchier bakeri Greene.
A. purpusii Koehne.
Range: 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Pome.

A small to large shrub; flowers in May; about 31,000 seeds per pound.

Amelanchier bartramiana (Tausch.) Roem. **Bartram serviceberry.**
A. oligocarpa (Michx.) Roem.
Range: 23, 24, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Pome, available July–August.

A large shrub; flowers in May.

Amelanchier botryapium, see *Amelanchier canadensis* and *A. oblongifolia.*

Amelanchier canadensis (L.) Medic (pl. 1, *A*). **Serviceberry.**
A. botryapium Borkh., *A. ovalis subcordata* DC., *A. canadensis botryapium* Torr. and Gray, *A. canadensis oblongifolia* Gray's Man. *A. canadensis obovalis* Sarg., in part, *A. canadensis pomentula* Sarg., *A. canadensis* Britt.
Range: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Pone, available June–August.

A small, or usually large shrub or small tree; rarely a large tree; usually occurs in rich soil; flowers before the leaves form, March–May; about 50,000 seeds per pound; germination about 70 percent, about 10,000 usable plants per pound of seed.

Stomach records: Twenty-seven species of birds including ruffed grouse; white-tailed deer. *Observations:* Eight species of birds, including bobwhite and mourning dove; cottontail rabbit, white-tailed deer.

Amelanchier covillei, see *Amelanchier alnifolia.*

Amelanchier crenata Greene.
Range: 11.
Site: Dry, sun.
Fruit: Pome.

A small to large shrub or small tree with dense foilage; flowers in April.

Amelanchier cusickii Fern. **Cusick serviceberry.**
Range: 6, 7, 8, 12.
Site: Dry, sun.
Fruit: Pome.

A large shrub; flowers April–June.

Observations: Sooty grouse.

Amelanchier elliptica, see *Amelanchier florida.*

Amelanchier florida Lindl. **Western serviceberry.**
A. elliptica Nels.
Range: 1, 2, 4, 7.
Site: Dry, well-drained, moist, sun.
Fruit: Pome, available July–September.

Usually a large shrub, occasionally a small tree or rarely a large tree; blooms April–June; often forms extensive thickets; sprouts promptly when browsed; very fire resistant; reproduces mainly by sprouts; leaves fall comparatively early.

Stomach records: Three species of birds. *Observations:* Sooty grouse; of outstanding importance as browse for mule deer. Very valuable stock forage.

Amelanchier goldmanii Woot. and Standl. **Goldman serviceberry.**
Range: 9, 11, 14.
Site: Well-drained, sun.
Fruit: Pome.

A large shrub to small tree.

Amelanchier humilis Wieg. **Small serviceberry.**
A. spicata Amer. auths. not (Lam.) Koch.
Range: 21, 22, 23, 24, 25, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Pome, available July–August.

A small stoloniferous shrub; forms extensive patches; usually occurs in sandy soil; flowers May–June; flowering and fruiting generally earlier northward; about 63,000 seeds per pound

Amelanchier huronensis Wieg.
Range: 23, 24.
Site: Well-drained, sun.
Fruit: Pome, available July–August.

A large shrub or small tree; usually occurs on sandy and limestone soil.

Amelanchier intermedia, see also *Amelanchier oblongifolia.*

Amelanchier intermedia Spach.
Range: 23, 24.
Site: Well-drained, moist, sun.
Fruit: Pome, available June–July.

A large shrub or rarely a small tree; clump-forming or widely branched near the ground. This species has formerly been confused with either *A. oblongifolia* or *A. canadensis* and records of wildlife utilization for these last species probably apply to this one as well.

Amelanchier laevis Wieg. **Smooth serviceberry.**
Range: 21, 22, 23, 24, 25, 26, 27, 28.
Site: Well-drained, moist, sun, shade.
Fruit: Pome, available June–July.

A small to large shrub or usually a small tree, less commonly a large tree; shrubbier northward; may occur on calcareous or noncalcareous soil; very handsome in cultivation; fruit very irregular in time of ripening.

Observations: Generally attractive to birds.

Amelanchier macrocarpa Lunell.
Range: 18, 21.
Site: Dry, well-drained, sun.
Fruit: Pome.

A small shrub; flowers April–June.

Amelanchier mormonica Schneid.
Range: 11, 13, 14.
Site: Well-drained, sun.
Fruit: Pome.

A small to large shrub or small tree; flowers May–June.

Amelanchier oblongifolia, see also *Amelanchier stolonifera.*

Amelanchier oblongifolia (Torr. and Gray) Roem. **Serviceberry.**
A. canadensis oblongifolia Torr. and Gray, *A. botryapium* Britt. and Brown, in part, *A. obovalis* Ashe, in part, *A. intermedia* Blanchard, in part, not Spach.
Range: 15, 18, 21, 22, 23, 24, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Pome, available June–July.

A large shrub to a small, or rarely large, tree; not stoloniferous, but often clump-forming.

Var. *micropetala* Robins., is a dwarf on exposed ledges or dry sandy soil near the coast in region 27.

Amelanchier obovalis, see *Amelanchier oblongifolia.*

Amelanchier oligocarpa, see *Amelanchier bartramiana.*

Amelanchier oreophila, see *Amelanchier alnifolia.*

Amelanchier ovalis, see *Amelanchier stolonifera.*

Amelanchier pallida, see *Amelanchier alnifolia.*

Amelanchier polycarpa Greene. **Cluster serviceberry.**
Range: 11, 13, 14.
Site: Well-drained, moist, shade.
Fruit: Pome, available in August.

A small to large shrub or small tree; flowers in May–July and bears an abundance of fruit.

Browse value for livestock varies in different localities and at different seasons; excellent in southwestern Utah; inferior in southeastern Utah.

Amelanchier prunifolia Greene. **Redbud serviceberry.**
A. rubescens Greene.
Range: 9, 11, 13, 14.
Site: Dry, sun.
Fruit: Pome.

A small to large shrub or small tree, reported to be evergreen; flowers April–June.

Generally worthless forage for livestock in summer but of some value to sheep and goats in the spring; not injured by as much as 25 percent grazing.

Amelanchier pumila Nutt.
Range: 13.
Site: Dry, well-drained, sun.
Fruit: Pome.

A small shrub with depressed branches; flowers June–July.

Amelanchier purpusii, see *Amelanchier bakeri.*

Amelanchier rotundifolia, see *Amelanchier sanguinea.*

Amelanchier rubescens, see *Amelanchier prunifolia.*

Amelanchier sanguinea (Pursh) DC. **Serviceberry.**
A. spicata Robins. and Fern., *A. rotundifolia* (Michx.) Roem., *A. canadensis rotundifolia* Torr. and Gray, *A. canadensis spicata* Sarg., *A. spicata* (Lam.) Koch.
Range: 23, 24, 26, 27.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Pome, available July–August.

A small to large shrub; flowers May–June; not stoloniferous and not colony-forming.

Observations: Red squirrel.

Amelanchier spicata, see *Amelanchier humilis, A. sanguinea* and *A. stolonifera.*

Amelanchier stolonifera Wieg. **Creeping shadbush.**
A. spicata Britt. and Brown, in part, *A. ovalis* of European auths., in part, *A. oblongifolia* Robins. and Fern.
Range: 23, 24, 26, 27, 28.
Site: Dry, well-drained, moist, sun.
Fruit: Pome, available in July.

A small stoloniferous shrub; flowers in May; colony forming; often occurs on sand or noncalcareous soil or gravel; foliage dense.

Observations: Cottontail rabbit.

Amelanchier utahensis Koehne. **Utah serviceberry.**
Range: 6, 7, 8, 9, 11.
Site: Dry, well-drained, sun.
Fruit: Pome.

A small to large shrub; flowers May–June.

Observations:: Black-tailed deer. Good to excellent forage for sheep and goats; grazed moderately to heavily by cattle, especially in early spring.

Amelanchier venulosa, see *Amelanchier alnifolia.*

Amoreuxia wrightii Gray.
Range: 10, 11, 17, 30.
Site: Dry, sun.
Fruit: Capsule, available August–September.

A small shrub.

Amorpha spp. **Indigobushes.**

Propagation of all species is by seeds sown as soon as ripe, greenwood cuttings made in early summer, hardwood cuttings made in fall, or by layers and suckers.

Stomach records (in addition to specific records): Antelope jack rabbit, Texas jack rabbit.

Amorpha angustifolia, see *Amorpha fruticosa.*

Amorpha californica Nutt. **California indigobush.**
A. hispidula Greene.
Range: 3, 5, 10, 11, 14.
Site: Dry, well-drained, moist, sun.
Fruit: Legume.

A large, rapid-growing shrub with thick foliage; flowers May–July.

Observations: Particularly palatable to captive deer. Not used by livestock.

Amorpha canescens Pursh. **Leadplant.**
Range: 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 29.
Site: Dry, well-drained, sun.
Fruit: Legume, available August–September.

A small shrub, leafy to the base; roots 6–16 feet deep; behaves as an herb under annual mowing; flowers July–August; occurs in sandy or in other soils; very handsome in cultivation; often considered a weed in pastures; about 105,000 seeds per pound, germination about 30 percent. Sparingly grazed by livestock.

Amorpha fragrans, see *Amorpha fruticosa.*

Amorpha fruticosa L. **Indigobush.**
A. occidentalis Abrams, *A. fragrans* Sweet, *A. fruticosa angustifolia* Pursh, *A. angustifolia* (Pursh) Boynton.
Range: 5, 10, 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25. 27, 28, 29.
Site: Well-drained, moist, sun, shade.
Fruit: Legume, available in August.

A small to large shrub with rather sparse foliage; flowers May–July; often grows in clumps; rarely attacked by insects or disease; often occurs on calcareous soil; very variable and with a number of varieties in cultivation; grows on coal-stripped lands in Illinois; 55,000–60,000 seeds per pound, germination 60–70 percent, about 10,000 usable plants per pound of seed.

Stomach records: Bobwhite. Possibly poisonous to livestock.

Amorpha glabra Desf. **Mountain-indigo.**
A. montana Boynton.
Range: 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Legume.

A small to large shrub; flowers May–June.

Amorpha herbacea Walt.
Range: 29, 30.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small shrub; flowers June–July; ordinarily occurs on sandy or sterile soil

Amorpha hispidula, see *Amorpha californica.*

Amorpha laevigata Nutt.
Range: 20, 25, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Legume.

A large shrub; pods one-seeded.

Amorpha microphylla Pursh. **Dwarf indigobush.**
A. nana Nutt.
Range: 14, 15, 18, 22, 23.
Site: Dry, sun.
Fruit: Legume, available in July.

A small shrub; flowers May–June; about 60,000 seeds per pound; germination about 50 percent.

Amorpha montana, see *Amorpha glabra.*

Amorpha nana, see *Amorpha microphylla.*

Amorpha nitens Boynton.
Range: 29.
Site: Moist, sun.
Fruit: Legume.

A small to large shrub; flowers in July.

Amorpha occidentalis, see *Amorpha fruticosa.*

Amorpha paniculata Torr. and Gray.
Range: 11, 20, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Legume.

A large shrub; often occurs in salt marshes.

Amorpha schwerinii Schneid. **Schwerin-indigo.**
Range: 28.
Site: Dry, well-drained, sun.
Fruit: Legume.

A large shrub.

Amorpha tennesseensis Shuttlew. **Tennessee-indigo.**
Range: 25, 27, 29.
Site: Well-drained, moist, sun.
Fruit: Legume.

A large shrub.

Amorpha texana Buckl.
Range: 16, 17, 20.
Site: Well-drained, sun.
Fruit: Legume.
A small to large shrub.

Amorpha virgata Small. **Mountain-indigo.**
Range: 29, 30.
Site: Dry, well-drained, shade.
Fruit: Legume.
A small to large, very rare shrub.

Ampelopsis arborea, see *Cissus arborea.*

Ampelopsis cordata, see *Cissus ampelopsis.*

Ampelopsis heptaphylla, see *Parthenocissus heptaphylla.*

Ampelopsis quinquefolia, see *Parthenocissus quinquefolia.*

Amphiachyris fremontii, see *Amphipappus fremontii.*

Amphipappus fremontii (Gray) Torr. and Gray. **Fremont chaffbush.**
Amphiachyris fremontii Gray.
Range: 10.
Site: Dry, sun.
Fruit: Achene.
A small shrub with rigid branches; occurs in gravel or rocky soil.

Amygdalus andersonii, see *Prunus andersonii.*

Amygdalus fasciculata, see *Prunus fasciculata.*

Amygdalus fremontii, see *Prunus eriogyna.*

Amygdalus glandulosa, see *Prunus texana.*

Amygdalus minutiflora, see *Prunus minutiflora.*

Amygdalus texana, see *Prunus texana.*

Amyris madrensis Wats.
Range: 17.
Site: Dry, well-drained, sun.
Fruit: Drupe.
A small to large, very leafy shrub.

Amyris parvifolia, see *Amyris texana.*

Amyris texana (Buckl.) Wilson. **Chapatillo.**
Xanthoxylum texanum Buckl., *Amyris parvifolia* Gray.
Range: 17.
Site: Dry, well-drained, sun.
Fruit: Drupe.
A small to large shrub.

Andrachne phyllanthoides (Nutt.) Coult.
Lepidanthus phyllanthoides Nutt., *Savia phyllanthoides* (Nutt.) Pax. and Hoffm.
Range: 16, 17, 20, 25.
Site: Dry, well-drained, sun.
Fruit: Capsule, available September–October.
A small, straggling, much-branched shrub; flowers July–August.

Andrachne reverchonii Coult.
Savia phyllanthoides reverchonii (Coult.), Pax and Hoffm.
Range: 16, 25.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small, densely leafy shrub.

Andromeda acuminata, see *Leucothoë acuminata.*

Andromeda arboreum, see *Oxydendrum arboreum.*

Andromeda axillaris, see *Leucothoë axillaris.*

Andromeda baccata, see *Gaylussacia baccata.*

Andromeda caerulea, see *Phyllodoce caerulea.*

Andromeda calyculata, see *Chamaedaphne calyculata.*

Andromeda canescens, see *Andromeda glaucophylla.*

Andromeda cassinefolia, see *Zenobia cassinefolia.*

Andromeda catesbaei, see *Leucothoë catesbaei.*

Andromeda floribunda, see *Pieris floribunda.*

Andromeda glaucophylla Link. Downy bog-rosemary.
A. canescens Small.
Range: 23, 24, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Capsule, available September–November.

A small, evergreen shrub; ordinarily occurs in very acid peat; flowers May–July.

Andromeda ligustrina, see *Xolisma ligustrina.*

Andromeda mertensiana, see *Cassiope mertensiana.*

Andromeda polifolia L. Bog-rosemary.
Range: 4, 12, 23, 24, 26, 27.
Suite: Moist, sun.
Fruit: Capsule.

A small to large evergreen shrub; flowers May–July; possesses creeping rootstocks; occurs on acid peat; rarely attacked by insects or disease.

Stomach records: Ptarmigan. Normally rejected by grazing animals; but poisonous to stock, especially in spring.

Andromeda pulverulenta, see *Zenobia pulverulenta.*

Andromeda racemosa, see *Leucothoë racemosa.*

Andromeda recurva, see *Leucothoë recurva.*

Anisacanthus insignis Gray.
A. pumilus Wats.
Range: 11.
Site: Dry, sun.
Fruit: Capsule.

A small shrub, palatable to stock but not as much so as *A. thurberi.*

Anisacanthus pumilus, see *Anisacanthus insignis.*

Anisacanthus thurberi (Torr.) Gray. Taparosa.
Drejera thurberi Torr.
Range: 11.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.

A small shrub with fairly good to very good palatability as stock forage; often closely browsed by sheep and cattle.

Anisacanthus wrightii (Torr.) Gray.
Drejera wrightii (Torr.) Gray.
Range: 11, 16, 17, 20, 30.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small shrub; palatable to stock but not as much so as the preceding.

Anisostichus capreolata, see *Bignonia capreolata.*

Anneslia eriophylla, see *Calliandra eriophylla.*

Anona triloba, see *Asimina triloba.*

Apinus albicaulis, see *Pinus albicaulis.*

Apinus flexilis, see *Pinus flexilis.*

Aplopappus acradenius (Greene) Blake. Goldenbush.
Bigelovia acradenius Greene, *Isocoma acradenius* Greene.
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small, tufted shrub; flowers September–October.

Aplopappus arborescens Hall. **Goldenfleece.**
Bigelovia arborescens Gray, *Chrysoma arborescens* Greene, *Ericameria arborescens* Greene.
Range: 1, 4, 5.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small or usually large evergreen shrub; flowers September–November. Grazing value nil.

Aplopappus bloomeri Greene. **Bloomer goldenbush.**
Chrysothamnus bloomeri (Gray) Greene.
Range: 4.
Site: Dry, sun.
Fruit: Achene.

A small shrub; flowers August–September; grazing value small.

Aplopappus brachylepis, see *Aplopappus propinquus.*

Aplopappus canus (Gray) Blake.
Diplostephium canum Gray, *Corethrogyne detonsa* Greene, *C. cana* Greene, *Hazardia cana* Greene, *H. detonsa* Greene, *H. serrata* Greene.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small shrub; flowers July–August; very handsome; somewhat cultivated.

Aplopappus cooperi (Gray) Hall. **Cooper goldenbush.**
Ericameria monactis (Gray) McClatch., *Acamptopappus microcephalus* Jones, *Chrysothamnus corymbosus* Elmer, *Tumionella monactis* Greene.
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small, very leafy shrub.

Aplopappus cuneatus Gray. **Wedgeleaf goldenbush.**
Ericameria cuneatus McClatch., *Bigelovia cuneata spathulata* (Gray) Hall, *Bigelovia spathulata* Gray.
Range: 4, 5, 10.
Site: Dry, sun.
Fruit: Achene.

A small shrub.

Aplopappus ericoides (Less.) Hook. and Arn. (pl. 2, *A*). **Mock-heather.**
Ericameria ericoides (Less.) Jeps.
Range: 5, 9.
Site: Well-drained, sun.
Fruit: Achene.

A small shrub; flowers August–September; usually occurs on sand dunes; stems decumbent.

Aplopappus interior, see *A. linearifolius.*

Aplopappus laricifolius Gray.
Chrysoma laricifolius (Gray) Greene, *Bigelovia nelsonii* Fern., *Ericameria nelsonii* Blake.
Range: 10, 11.
Site: Dry, sun.
Fruit: Achene.

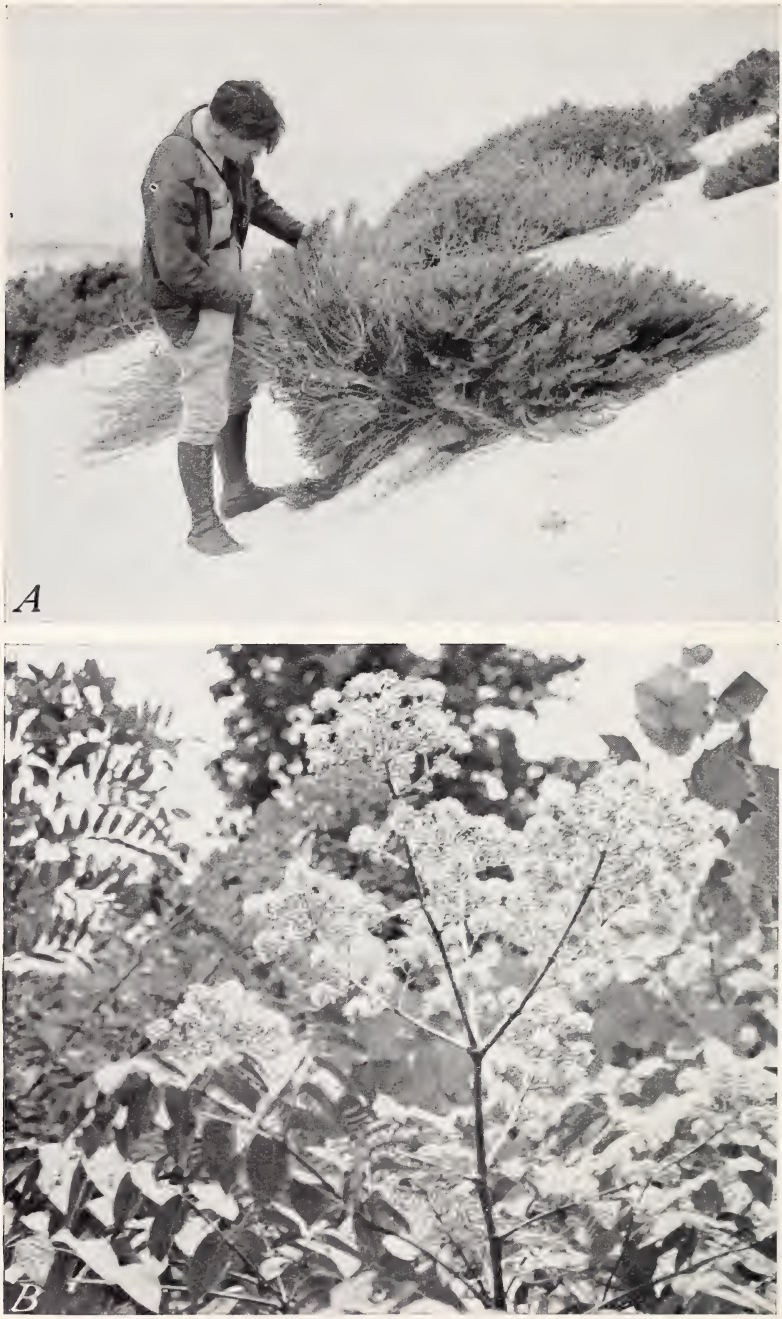
A small shrub, exceedingly handsome in flower.

Aplopappus linearifolius DC. **Narrowleaf goldenbush.**
Stenotopsis linearifolius (DC.) Rydb., *Stenotus linearifolius* Torr. and Gray.
Range: 5, 9, 10.
Site: Dry, sun.
Fruit: Achene.

A small to large shrub; flowers March–May.

Var. *interior* (Cov.) Jones (*Aplopappus interior* Cov., *Stenotopsis interior* Rydb.) extends the range to regions 9 and 10.

A, *Amelanchier canadensis*. The pomes of this plant attract many birds to woodland borders where it often fruits abundantly. *B*. *Berberis nervosa*. The thicket-forming habit of this species even under the shade of trees suggests its possible use as a woodland ground cover. Its wildlife value is probably greater than recorded.



A, *Aplopappus ericoides*, a species well adapted to sand-dune planting. *B*, *Aralia spinosa*. The great flower sprays, followed by equally large fruit clusters, suggest the use of this species in highway planting; however, it provides poor cover for soil unless thickly planted. (Photograph by Department of the Interior.)

Aplopappus nanus Eaton. **Dwarf goldenbush.**
A. resinosus Gray, *Ericameria nana* Nutt., *E. resinosa* Nutt., *Chrysoma nana* Greene.
Range: 4, 6, 7, 8, 12.
Site: Dry, sun.
Fruit: Achene.
A small shrub.

Aplopappus palmeri Gray. **Palmer goldenbush.**
Ericameria palmeri (Gray) Hall, *Chrysoma palmeri* Greene.
Range: 5.
Site: Dry, sun.
Fruit: Achene.
A large, much-branched, bushy, evergreen shrub.

Aplopappus parishii (Greene) Blake. **Parish goldenbush.**
Ericameria parishii Hall, *Bigelovia parishii* Greene, *Chrysoma parishii* Greene.
Range: 10.
Site: Dry, sun.
Fruit: Achene.
A large, resinous, densely leafy shrub.

Aplopappus pinifolius Gray. **Pineleaf goldenbush.**
Ericameria pinifolia (Gray) Hall.
Range: 10.
Site: Dry, sun.
Fruit: Achene.
A small to large, bushy shrub.

Aplopappus propinquus Blake . **Chaparral goldenbush.**
Ericameria brachylepis Hall, *Bigelovia brachylepis* Gray, *Chrysoma brachylepis* Greene, *Haplopappus brachylepis brachylepis* Hall.
Range: 5, 10.
Site: Dry, sun.
Fruit: Achene.
A large, very leafy, brittle-stemmed shrub.

Aplopappus resinosus, see *Aplopappus nanus.*

Aplopappus scopulorum (Jones) Blake.
Bigelovia menziesii scopulorum Jones, *Isocoma scopulorum* (Jones) Rydb., *Hesperodoria scopulorum* Greene.
Range: 9.
Site: Dry, sun.
Fruit: Achene.
A small shrub; flowers August–September.

Aplopappus squarrosus Hook. and Arn. **Coast goldenbush.**
Hazardia squarrosa Greene.
Range: 5, 10.
Site: Dry, well-drained, sun.
Fruit: Achene.
A small shrub; flowers freely September–October; openly branched; occasionally somewhat herbaceous.

Aralia humilis Cav.
Range: 10.
Site: Dry, sun.
Fruit: Berry.
A small to large shrub.

Aralia spinosa L. (pl. 2, *B*). **Hercules-club.**
Range: 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available August–November.
Usually a large shrub or a small tree or rarely large tree; flowers June–August; very spiny; leaves very large; suckers freely if killed above ground;

seriously attacked in cultivation by the lilac borer; propagation is by seed sown as soon as ripe or stratified and sown in spring, or by root cuttings.

Stomach records: Turkey. *Observations:* Much eaten by birds; white-tailed deer.

Arbutus spp. **Madrones.**

Propagation is by seeds sown under glass in fall or spring.

Stomach records (in addition to specific records): Mearn's quail. *Observations* (in addition to specific records): Band-tailed pigeon.

Arbutus arizonica (Gray) Sarg. **Arizona madrone.**

A. xalapensis arizonica Gray.

Range: 11, 14.
Site: Dry, well-drained, sun.
Fruit: Berry, available July–December.

A large evergreen tree; flowers in May. Not grazed, except rarely by goats.

Arbutus menziesii Pursh. **Madrone.**

Range: 1, 2, 3, 5, 10.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available July–January.

A small to generally large and widely-branched tree; flowers March–May; commonly shrubby southward; stump sprouts after injury; wood somewhat used commercially; bark used for tanning; seeds 25–30 per berry; about 1,000 usable plants per pound of seed; difficult to transplant; very handsome and commonly cultivated.

Stomach records: Two species of birds. *Observations:* Five species of birds including dove, band-tailed pigeons, and turkey; extensively eaten by deer; of slight importance as browse for mule deer; raccoon, ring-tailed cat. Lightly grazed by cattle or heavily grazed by goats. A good bee plant.

Arbutus texana Buckl. **Texas madrone.**

A. xalapensis texana Gray.

Range: 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Berry, available August–June.

A large shrub or small tree or rarely a large tree; evergreen; often found on limestone soil; wood used commercially to some extent; berries palatable. Occasionally browsed by stock.

Arbutus uva-ursi, See *Arctostaphylos uva-ursi.*

Arctostaphylos spp. **Manzanitas.**

Ordinarily chaparral shrubs; many species hold the leaves vertically; most reproduce extensively by root shoots; propagated by seeds sown in spring after stratification for 140 days at 41°–50° F.

Stomach records (in addition to specific records): Seventeen species of birds, including dusky grouse, California quail, sharp-tailed grouse; gray fox, raccoon, striped skunk, coyote, Inyo chipmunk, western skunk. *Observations* (in addition to specific records): Seven species of birds including dusky grouse, band-tailed pigeon, Merriam's turkey; mountain sheep, New Mexico black bear, Allen's chipmunk, golden-mantled ground squirrel, Oregon gray fox, ring-tailed cat, California gray squirrel. Usually of small value as forage except for goats.

Arctostaphylos andersonii Gray. **Heartleaf manzanita.**

A. pechoensis Dudl., *Uva-ursi pechoensis* (Dudl.) Abrams, *U. andersonii* (Gray) Abrams.

Range: 1, 5.
Site: Dry, well-drained, sun.
Fruit: Berry, available January–September.

A large evergreen shrub; does not crown sprout after fire.

Arctostaphylos bicolor (Nutt.) Gray.

A. veatchii Kell., *Xylococcus bicolor* Nutt.

Range: 5.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small, densely-branched evergreen shrub.

Arctostaphylos canescens Eastw.
Range: 4, 5.
Site: Dry, well-drained, sun.
Fruit: Berry, available all year round.

A large evergreen shrub; often grows on gravelly slopes; apparently does not sprout after fires.

Arctostaphylos cinerea Howell.
Range: 4.
Site: Dry, sun.
Fruit: Berry.

A large evergreen shrub.

Arctostaphylos columbiana Piper. **Hairy manzanita.**
Range: 1, 5.
Site: Well-drained, sun.
Fruit: Berry.

A large evergreen shrub that does not crown sprout after fire.

Arctostaphylos crustacea Eastw.
Range: 1.
Site: Dry, sun.
Fruit: Berry.

A small to large evergreen shrub.

Arctostaphylos diversifolia Parry.
A. arguta diversifolia Parry, *Comarostaphylos diversifolia* Greene.
Range: 5.
Site: Dry, sun.
Fruit: Berry, available all year round.

A large shrub to small evergreen tree; about 16,000 seeds per pound.

Arctostaphylos drupacea McBr. **Roughleaf manzanita.**
Uva-ursi drupacea (McBr.) Abrams.
Range: 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Berry, available June–July.

A large evergreen shrub; does not stump sprout. This species is possibly only a variety of *A. pringlei.*

Observations: Fair browse for mule deer.

Arctostaphylos glandulosa Eastw. **Eastwood manzanita.**
A. vestita Eastw., *A. virgata* Eastw.
Range: 1, 5.
Site: Dry, well-drained, sun.
Fruit: Berry, available February–November.

A small to large evergreen shrub, often found on sandstone; root crown broad and woody, giving rise to numerous sprouts after chaparral fires; decumbent branches root.

Observations: Of slight importance as browse for mule deer.

Arctostaphylos glauca Lindl. **Great-berried manzanita.**
Uva-ursi glauca (Lindl.) Abrams.
Range: 3, 5, 8, 9, 10.
Site: Dry, well-drained, sun.
Fruit: Berry.

A large shrub to small tree; evergreen; colony forming; slow growing; thrives on many kinds of soil; does not recover rapidly after burning.

Observations: Fair browse for mule deer.

Arctostaphylos hookeri Don.
Uva-ursi hookeri (Don) Abrams.
Range: 1.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small evergreen shrub growing on sandy or other soils; decumbent branches root at the nodes.

Arctostaphylos insularis Greene.
Uva-ursi insularis (Greene) Abrams.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Berry.

A large evergreen shrub.

Arctostaphylos manzanita Parry. (pl. 3, *A*, *B*). **Parry manzanita.**
Uva-ursi manzanita (Parry) Abrams.
Range: 1, 4.
Site: Dry, well-drained, sun.
Fruit: Berry, available all year round.

A large, slow-growing evergreen shrub; killed by fire and does not crown sprout.

Stomach records: Four species of birds, including dusky grouse and sharp-tailed grouse. An important honey plant.

Arctostaphylos mariposa Dudl. **Mariposa manzanita.**
Uva-ursi mariposa (Dudl.) Abrams.
Range: 4.
Site: Dry, well-drained, sun.
Fruit: Berry, available August–September.

A large evergreen shrub; does not sprout after fire.

Observations: Mountain quail; of slight value as forage for mule deer; mountain coyote, California gray fox.

Arctostaphylos mewukka Merr.
A. pastillosa Jeps.
Range: 4.
Site: Dry, sun.
Fruit: Berry.

A large evergreen shrub: stump sprouts after fire.

Arctostaphylos montana Eastw.
Uva-ursi montana (Eastw.) Abrams.
Range: 1.
Site: Dry, sun.
Fruit: Berry.

A small shrub to small tree; bushy and evergreen; does not survive fire except as seed; apparently restricted to serpentine areas.

Arctostaphylos myrtifolia Parry.
Uva-ursi myrtifolia (Parry) Abrams.
Range: 4.
Site: Well-drained, sun.
Fruit: Berry.

A small evergreen shrub.

Arctostaphylos nevadensis Gray. **Pine-mat manzanita.**
Uva-ursi nevadensis (Gray) Abrams.
Range: 4.
Site: Dry, well-drained, sun.
Fruit: Berry, available July–September.

A small evergreen shrub; often low and procumbent, rooting where the branches touch the ground.

Stomach records: Three species of birds including sooty and dusky grouse.

Observations: Fair browse for mule deer. Sparingly browsed by cattle.

Arctostaphylos nummularia Gray.
Uva-ursi nummularia (Gray) Abrams.
Range: 1.
Site: Well-drained, sun.
Fruit: Berry.

A small evergreen shrub.

Arctostaphylos oblongifolia Howell.
Range: 4.
Site: Dry, sun.
Fruit: Berry.

A large shrub to small tree; evergreen.

Arctostaphylos parryana Lemmon.
Uva-ursi parryana (Lemmon) Abrams.
Range: 4, 5.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small evergreen shrub. Very closely related to *A. manzanita* and possibly better made a variety of that species.

Arctostaphylos pastillosa, see *Arctostaphylos mewukka.*

Arctostaphylos patula Greene. **Greenleaf manzanita.**
A. platyphylla (Gray) Kuntze, *Uva-ursi patula* (Greene) Abrams.
Range: 1, 3, 4, 9, 11, 13.
Site: Dry, well-drained, sun.
Fruit: Berry; available May–September, occasionally persists all year round.

A large evergreen shrub; repeated burnings cause the formation of a large root crown, which sprouts after each fire; heavy snowfall may force its branches to the ground, where they root; attempts have been made to eradicate it with concentrated goat feeding, but these have proved impracticable.

Observations: Of outstanding importance as browse for mule deer. An emergency winter feed for livestock.

Arctostaphylos pechoensis, see *Arctostaphylos andersonii.*

Arctostaphylos platyphylla, see *Arctostaphylos patula.*

Arctostaphylos pringlei Parry.
Uva-ursi pringlei (Parry) Abrams.
Range: 10, 11, 14.
Site: Dry, sun.
Fruit: Berry.

A large evergreen shrub.

Observations: Mearn's and Gambel quail; skunks, foxes, coyotes.

Arctostaphylos pumila Nutt. **Sandmat manzanita.**
Uva-ursi pumila (Nutt.) Abrams.
Range: 1.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small evergreen shrub or sometimes a vinelike plant; stems prostrate, forming mats; occurs most often on sandy soil.

Arctostaphylos pungens H. B. K. **Pointleaf manzanita.**
Uva-ursi pungens (H. B. K.) Abrams.
Range: 9, 10, 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Berry, available July–April.

A small to large evergreen shrub; root system fibrous, generalized, not deep, but taproots well developed in light sandy soil; decumbent branches root; germination of seed about 35 percent or less.

Stomach records: Sooty grouse; northern hooded skunk, black-tailed deer. *Observations:* Blue grouse, Mearn's and Gambel quail; bear, pigeons, skunks, foxes, coyotes. Freely grazed by goats.

Arctostaphylos sensitiva Jeps.
Range: 1.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small evergreen shrub; often invades burnt-over areas; root system shallow; colony-forming; killed outright by chaparral fires.

Arctostaphylos setosissima Eastw.
Range: 1.
Site: Dry, well-drained, sun.
Fruit: Berry.

A large evergreen shrub.

Arctostaphylos stanfordiana Parry.
Uva-ursi stanfordiana (Parry) Abrams.
Range: 4.
Site: Dry, sun.
Fruit: Berry.

A large evergreen shrub: killed in shaparral fires.

Arctostaphylos tomentosa (Pursh) Lindl. (pl. 4, *A*).
Uva-ursi tomentosa (Pursh) Abrams.
Range: 1, 4, 5, 11.
Site: Dry, well-drained, sun.
Fruit: Berry, available all year round.

A small to large evergreen shrub; forms very good soil cover.

Var. *crassifolia* Jeps. occurs in region 5 and is killed entirely by fire.

Arctostaphylos uva-ursi (L.) Spreng. **Bearberry.**
Arbutus uva-ursi L., *Uva-ursi uva-ursi* (L.) Britt.
Range: 1, 4, 12, 13, 14, 18, 21, 22, 23, 24, 26, 27, 28.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available August–March or rarely persistent all year round.

A small evergreen shrub or, more properly, a woody vine; occurs most commonly on sandy soil, but may occur on loam; propagation by cuttings taken in late summer and rooted under glass or by seed.

Stomach records: Eighteen species of birds, including ruffed grouse and dusky grouse; mountain sheep, black-tailed deer. *Observations:* Ruffed grouse, Richardson's grouse, spruce grouse, turkey, dusky grouse, sharp-tailed grouse, black bear; browsed to some extent by northern white-tailed deer. Of little value for livestock.

Arctostaphylos veatchii, see *Arctostaphylos bicolor.*

Arctostaphylos vestita, see *Arctostaphylos glandulosa.*

Arctostaphylos virgata, see *Arctostaphylos glandulosa.*

Arctostaphylos viscida Parry. **Whiteleaf manzanita.**
Uva-ursi viscida (Parry) Abrams.
Range: 1, 4.
Site: Dry, well-drained, sun.
Fruit: Berry, available all year round.

A large evergreen shrub or rarely a small tree; does not crown sprout after fire.

Argentacer saccharinum, see *Acer saccharinum.*

Aristolochia spp. **Pipe-vines.**

Stomach records (in addition to specific records): Gambel quail, but this record may apply to *A. watsonii*, a nonwoody vine.

Aristolochia californica Torr. **California pipe-vine.**
Range: 1, 3, 4.
Site: Well-drained, sun, shade.
Fruit: Capsule.

A vine; flowers March–April; ordinarily climbs on shrubs.

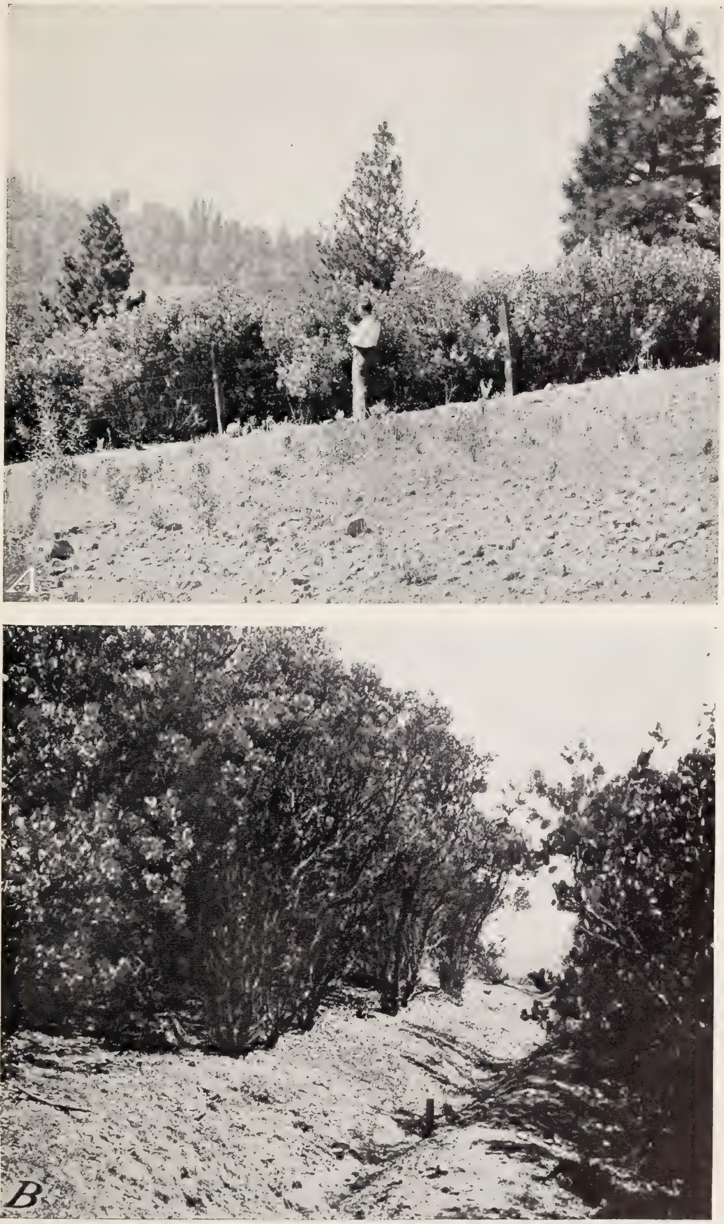
Aristolochia durior Hill. **Dutchman's pipe-vine.**
Aristolochia macrophylla Lam., *A. sipho L'Her.*
Range: 22, 23, 25, 27.
Site: Well-drained, sun.
Fruit: Capsule, available in September.

A vigorous vine; flowers May–June; propagation by seeds stratified 140 days at 50° F. before sowing; much cultivated; probably introduced into region 23.

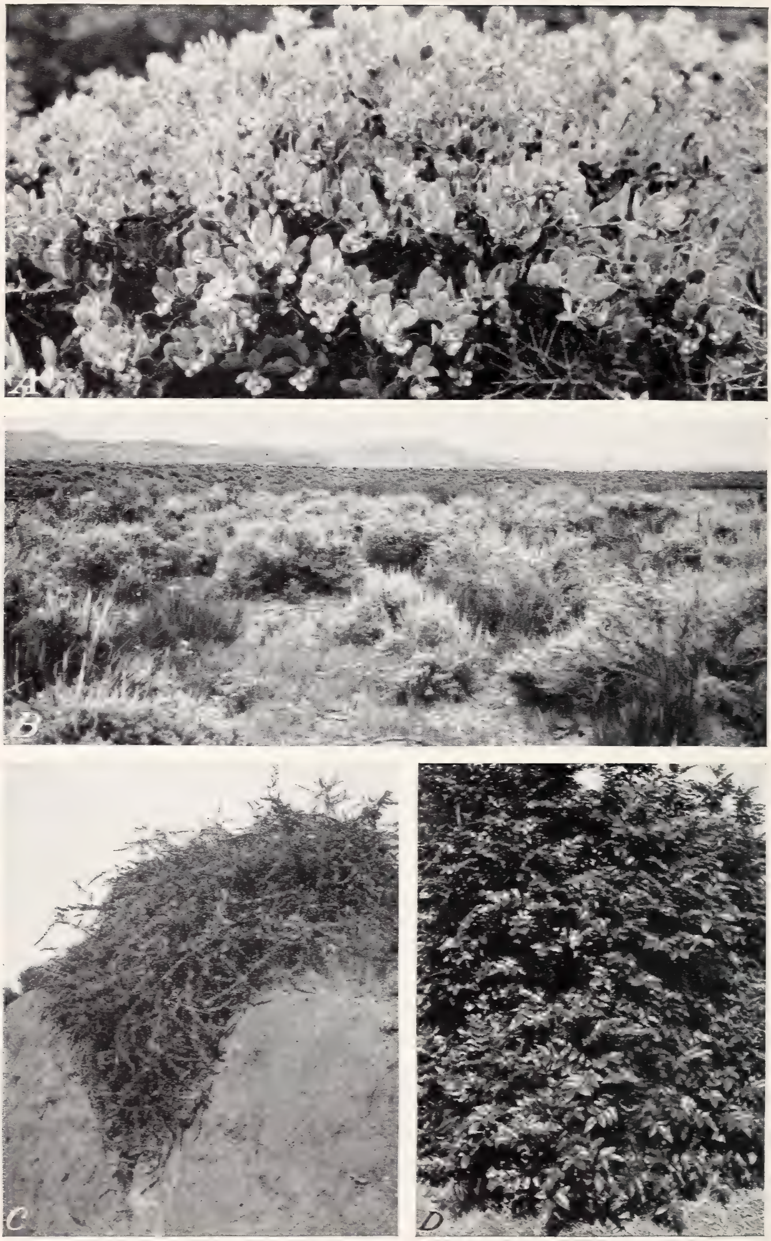
Aristolochia macrophylla, see *Aristolochia durior.*

Aristolochia sipho, see *Aristolochia durior.*

Aristolochia tomentosa Sims. **Woolly pipe-vine.**
Range: 22, 25, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule, available September–November.



Arctostaphylos manzanita. *A*, Prevention of erosion on part of this central-California hillside is assured by a dense thicket of manzanita. Young plants pioneering in the worn-out cultivated field in the foregound may soon afford protection to the rest of the hillside. *B*, A view in the interior of the same thicket showing the dense cover and litter accumulation. The cleared drainage ditch carries water from a cultivated field.



A, Arctostaphylos tomentosa. The ability of most species of *Arctostaphylos* to grow in poor soils, their thicket-forming habit, and their abundant fruit production, makes the majority of them of great value in plantings for erosion control and wildlife. *B, Artemisia tridentata*. Typical sagebrush country. The lighter colored bushes are the big sagebrush, important alike as soil and wildlife cover and as food for wildlife and livestock. *C, Atriplex canescens*. This plant, of considerable importance for wildlife and livestock, and without question a valuable soil cover, merits considerable use in planting operations in the Southwest. *D, Berberis aquifolium*. A cover of such density as this should prove exceptionally valuable for soil as well as wildlife. The Oregon-grape is fairly resistant to black stem rust.

A high-climbing vine; flowers May–June; in Alabama has shown a tendency to spread.

Aronia spp. Chokeberries.

Shrubs; commonly occur in acid soil; propagation by seed stratified 90 days at 22°–41° F. before sowing.

Stomach records (in addition to specific records): 12 species of birds, including ruffed grouse, bobwhite, sharp-tailed grouse, ring-necked pheasant, prairie chicken; composed 1.0 percent of food of prairie chicken in Wisconsin. *Observations* (in addition to specific records): Eight species of birds including ruffed grouse, bobwhite, sharp-tailed grouse; an important pheasant food, especially in late winter, in southern Michigan; cottontail rabbit.

Aronia arbutifolia (L.) Ell. Red chokeberry.

Pyrus arbutifolia L. f.

Range: 22, 23, 25, 27, 28, 29, 30.

Site: Dry, well-drained, moist, sun, shade.

Fruit: Berry; available August–October, persistent, especially southward.

A small to rarely large shrub; flowers March–May; somewhat subject to blight and borer attack; will withstand city smoke; leaves fall very late; propagation by seeds stratified 90 days at 32°–41° F.; about 10,000 usable plants per pound of seed; probably introduced into region 23.

Var. *atropurpurea* (Britt.) Robins., (*A. atropurpurea* Britt., *A. floribunda* Spach), the purple chokeberry, is often separated as a distinct species. Intergrading forms are common, field identification difficult, seeds in birds' stomachs are indistinguishable, and there appears to be no ecological differentiation between this and the species. *Observations:* Ruffed grouse, ring-necked pheasant.

Stomach records: 13 species of birds, including ruffed grouse. *Observations:* Cedar waxwing; captive marsh rabbit.

Aronia atropurpurea, see *Aronia arbutifolia.*

Aronia floribunda, see *Aronia arbutifolia.*

Aronia melanocarpa (Michx.) Ell. Black chokeberry.

Pyrus arbutifolia melanocarpa Michx., *P. melanocarpa* Willd., *P. nigra* Sarg., *A. nigra* Sarg.

Range: 22, 23, 24, 25, 26, 27, 28, 29.

Site: Dry, well-drained, moist, sun, shade.

Fruit: Berry, available August–September, often persistent until June–July.

A small or rarely large shrub; flowers March–June; somewhat subject to blight and borer attack; has been observed to grow on cinder dumps where fruit crops are often heavy.

Stomach records: Ruffed grouse, sharp-tailed grouse, prairie chicken; composed 5.3 percent of fall food of sharp-tailed grouse in Wisconsin. *Observations:* Eaten to some extent by cottontail rabbit; white-tailed deer.

Aronia nigra, see *Aronia melanocarpa.*

Arsenococcus frondosus, see *Xolisma ligustrina.*

Arsenococcus ligustrinus, see *Xolisma ligustrina.*

Artemisia spp. Sagebrushes.

Most species harbor the burdock borer and common stalk borer.

Stomach records (in addition to specific records): Five species of birds, including ruffed grouse and Gambel quail (these records apply to both herbaceous and shrubby species); mountain sheep, antelope jack rabbit, gray-sided jack rabbit, black-tailed deer. *Observations* (in addition to specific records): Hepburn's rosy finch; used extensively by sage grouse for cover, roosting cover and food, about 69 percent of their food consisting of composites, most of which are species of sagebrush, which are eaten particularly in winter and during times of scarcity of other foods; western white-tailed jack rabbit, Oregon jack rabbit; pygmy rabbit, especially in winter when the diet may be exclusively sagebrush; much eaten and furnishes cover and shelter to sage chipmunk; pronghorn antelope. Of great importance as forage for livestock.

Artemisia abrotanoides, see *Artemisia californica.*

Artemisia arbuscula Nutt. **Scabland sagebrush.**
A. tridentata arbuscula (Nutt.) Hall and Clem.
Range: 4, 7, 8, 9, 12.
Site: Dry, sun.
Fruit: Achene.

A small, much-branched, stiff, straggling shrub; seed germination about 40 percent.

Observations: Of slight value as forage for mule deer. Locally of some value as forage for livestock.

Artemisia bigelovii Gray. **Flat sagebrush.**
A. petrophila Woot. and Standl.
Range: 9, 10, 11, 16.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small, many-stemmed, spreading shrub considered more palatable to stock than the common sagebrush; very good spring browse, especially for sheep.

Artemisia bolanderi Gray.
A. tridentata bolanderi (Gray) Hall and Clem.
Range: 4.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small, much-branched, leafy-twigged shrub. Browse value about the same as that of *A. tridentata.*

Artemisia californica Less. **Coastal sagebrush.**
A. fischeriana Bess., *A. abrotanoides* Nutt., *Crossostephium californicum* Rydb., *C. foliosum* Rydb., *C. insulare* Rydb.
Range: 5, 10.
Site: Dry, sun.
Fruit: Achene.

A small to large, many-stemmed, xerophytic shrub; freely branched; a climax or subclimax dominant; casts very little shade; inflammable; browsed only by sheep and goats in times of scarcity.

Artemisia cana Pursh. **Silver sagebrush.**
A. columbiana Nutt., *A. viscidula* (Osterh.) Rydb.
Range: 4, 8, 9, 11, 12, 13, 15, 19, 21.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small or rarely large shrub; freely branched; found on plains and lower mountains; generally occurs on north and sheltered sides of hills; requires more water than *A. tridentata.*

Stomach records: One species of bird. *Observations:* Important food of sage grouse. A very important local browse for livestock.

Artemisia columbiana, see *Artemisia cana.*

Artemisia filifolia Torr. **Sand sagebrush.**
Range: 9, 11, 15, 16.
Site: Dry, sun.
Fruit: Achene.

A small, freely-branched shrub; occurs only on sandy soil; experiments in New Mexico in range seeding with this species were unsuccessful; fruiting heads often transformed into galls; a sand indicator, changes in its abundance indicating the amounts of sand in the soil; germination of seed 40–50 percent. Palatable to livestock and locally used as forage but seldom browsed in grassland districts.

Artemisia fischeriana, see *Artemisia californica.*

Artemisia frigida Willd. **Estafiata.**
Range: 7, 8, 9, 11, 12, 13, 14, 15, 16, 18, 19, 21, 23.
Site: Dry, sun.
Fruit: Achene.

A small shrub often only woody at the base or even entirely herbaceous; stems decumbent at base; a mat-forming species, especially when not shrubby;

an indicator of overgrazing; direct seeding experiments with this species were unsuccessful in New Mexico; not poisonous to livestock.

Observations: An important food of sage grouse; important winter food for elk, bighorn. Of high rank as forage for stock, the forage value increasing southward.

Artemisia nova Nels. **Small sagebrush.**
A. tridentata nova (Nels.) Hall and Clem.
Range: 7, 8, 9, 10, 11, 13.
Site: Dry, sun.
Fruit: Achene.

A small shrub; often occurs on shallow, stony soils. Of importance southward as forage for livestock.

Artemisia parishii Gray.
A. tridentata parishii (Gray) Hall and Clem.
Range: 9, 10.
Site: Dry, sun.
Fruit: Achene.

A small to usually large shrub; very much like *A. tridentata* and perhaps not specifically distinct; resembles that species in practically all ecological aspects. For browse value refer to *A. tridentata.*

Artemisia petrophila, see *Artemisia bigelovii.*

Artemisia rigida (Gray) Nutt. **Stiff sagebrush.**
A. trifida rigida Nutt.
Range: 7, 8, 12.
Site: Dry, sun.
Fruit: Achene.

A small shrub; very often occurs on lava outcrops.

A locally valuable browse plant, particularly palatable to horses; fair sheep forage.

Artemisia rothrockii Gray.
A. tridentata rothrockii (Gray) Hall and Clem.
Range: 4, 7, 8, 9, 10, 12, 13.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small shrub, usually confined to higher zones in the mountains. Browse value for livestock similar to that of *A. tridentata.*

Artemisia spinescens Eaton. **Bud sagebrush.**
Picrothamnus desertorum Nutt.
Range: 7, 8, 9, 10, 11, 12.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small, spiny, much-branched, rigid shrub with crowded stems; occurs on alkaline soil and indicates alkali in the soil; root system very extensive; extremely resistant to drought and overgrazing. An important forage for livestock, but poisonous or fatal to calves when eaten in quantity.

Artemisia tridentata Nutt. (pl. 4, *B*). **Big sagebrush.**
Range: 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15.
Site: Dry, well-drained, sun.
Fruit: Achene, available in October.

A small to large shrub, or in very good soil with plenty of water, a small tree; root system two storied with shallow fibrous, and deep-spreading roots; an indicator of deep soils largely free from alkali; seldom occurs on granitic soils; forms root sprouts to some extent; fairly rapid growing; direct seeding experiments with this species in New Mexico were unsuccessful; germination of seed 35 percent or less.

Stomach records: Dusky grouse, sage grouse; black-tailed deer. *Observations:* Columbian sharp-tailed grouse; mule deer, bighorn. A most important stock browse of special value in autumn and winter; variously reported as poor to excellent forage; however, it enables stockmen to carry enormous numbers of cattle through the winter months. Reported as mildly poisonous to sheep and horses but there appears to be no direct evidence of its toxicity.

Artemisia trifida, see *Artemisia tripartita.*

Artemisia tripartita Rydb. **Threetip sagebrush.**
A. trifida Nutt., *A. tridentata trifida* (Nutt.) Hall and Clem.
Range: 7, 8, 9, 10, 12.
Site: Dry, sun.
Fruit: Achene, available in October.
A small shrub of value as winter livestock browse.

Artemisia viscidula, see *Artemisia cana.*

Ascyrum cuneifolium Chapm.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Capsule.
A small shrub.

Ascyrum hypericoides L. **St.-Andrew's-cross.**
A. linifolium Spach.
Range: 17, 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule, available September–October.
A small, much-branched, erect or decumbent shrub; flowers June–September; occurs on sterile soil; short-lived; in cultivation.
Observations: White-tailed deer.

Ascyrum linifolium, see *Ascyrum hypericoides.*

Ascyrum microsepalum, see *Crookea microsepala.*

Ascyrum pumilum Michx.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Capsule.
A small, diffusely-branched shrub; flowers spring to summer; stems short, often matted; occurs on sand.

Ascyrum stans Michx. **St.-Peter's-wort.**
Range: 27, 28, 29, 30.
Site: Moist, sun.
Fruit: Capsule.
A small shrub; generally occurs on acid, sandy soil; flowers summer to fall.

Ascyrum tetrapetalum (Lam.) Vail.
Range: 29, 30.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A small shrub with very showy flowers produced from spring to fall or all year; usually occurs in sand.

Asimina angustifolia Gray. **Narrow-leaved papaw.**
Pityothamnus angustifolius (Gray) Small.
Range: 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Berry.
A small shrub.

Asimina grandiflora, see *Asimina incana.*

Asimina incana Bartr. **Flag papaw.**
A. grandiflora (Michx.) Gray. *A. speciosa* Nash, *Pityothamnus incanus* (Bartr.) Small.
Range: 29, 30.
Site: Well-drained, sun, shade.
Fruit: Berry.
A small shrub.

Asimina parviflora (Michx.) Dunal. **Dwarf papaw.**
Range: 20, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available August–September.
A large shrub with spreading branches; usually occurs in sand.

Asimina pygmaea (Bartr.) Gray.
Pityothamnus pygmaeus (Bartr.) Small.
Range: 30.
Site: Well-drained, sun, shade.
Fruit: Berry, available July–August.
A small shrub with arching or decumbent stems.

Asimina speciosa, see *Asimina incana.*

Asimina triloba (L.) Dunal. **Common papaw.**
Anona triloba L.
Range: 20, 22, 24, 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available August–October.

Commonly a large shrub to small tree, or rarely a large tree; flowers March–April; thicket forming by means of suckers; shrubby northward; often persistent and difficult to eradicate from fields; thickets often vigorous and dense; a lepidoterous larva injures the flowers throughout a good portion of its range, but when not attacked, fruit is abundantly produced; otherwise generally free from insect enemies; two forms are known, one with white, insipid fruit; the other with a yellow pulp, but these are not recognized botanically; propagation is by seed sown as soon as ripe; suckers are generally difficult to transplant; about 1,200 seeds per pound, germination about 50 percent, about 250 usable plants per pound of seed.

Stomach records: Gray fox, opossum. *Observations:* Probably much eaten by birds; opossum, squirrel, raccoon; leaves refused by captive marsh rabbits.

Astrophyllum dumosum, see *Choisya dumosa.*

Atragene americana, see *Clematis verticillaris.*

Atragene columbiana, see *Clematis columbiana.*

Atragene occidentalis, see *Clematis pseudoalpina.*

Atragene pseudoalpina, see *Clematis pseudoalpina.*

Atriplex spp. **Saltbushes.**

Monoecious or dioecious shrubs with a salty taste; the species harbor the spinach mildew and consequently should not be planted where spinach is a commercial crop.

Stomach records (in addition to specific records): Twenty-nine species of birds, including Gambel quail; white-sided jack rabbit, gray-sided jack rabbit; black-tailed deer. *Observations* (in addition to specific records): Three species of birds, including ring-necked pheasant; Oregon jack rabbit, in dry seasons. In general, of considerable importance as cover for plains wildlife. The salty taste may flavor milk and possibly have a bad effect on unweaned calves, lambs, and kids, although the same taste appears to increase the palatability to livestock.

Atriplex breweri Wats. **Brewer saltbush.**
A. lentiformis breweri (Wats.) Hall and Clem., *A. orbicularis* Wats.
Range: 1, 5.
Site: Dry, well-drained, sun.
Fruit: Achene.

A large monoecious or dioecious shrub with abundant foliage; rapid growing; very tolerant of salinity; foliage subject to leaf-mining insects; much cultivated, especially as a clipped hedge plant; seeds produced in abundance; occurs on sand, clay, and other soils.

Observations: California mule deer. Freely browsed by livestock.

Atriplex canescens (Pursh) Nutt. (pl. 4, *C*). **Wingscale.**
Calligonum canescens Pursh, *A. garrettii* Rydb., *A. macropoda* Rose and Standl., *A. linearis* Wats.
Range: 7, 8, 9, 10, 11, 15, 16, 17.
Site: Dry, sun.
Fruit: Achene, available August–September.

A small or rarely large, rapid-growing evergreen shrub; dioecious or rarely monoecious; tolerates alkali but not necessarily found on alkaline soil; root system extensive; taproots 30–40 feet deep; extremely drought resistant; will withstand comparatively low temperatures; very brittle; for range planting sow seeds 14–16 pounds per acre in March–April; can be seeded, if local seed is used, as soon as seed is ripe; germination 30–60 percent.

Observations: Depended upon to a high degree by scaled quail for shade, cover, roost, and food; captive porcupine, rock squirrel, gray-spotted ground squirrel, Arizona jack rabbit. Produces great quantities of seeds, which are fattening and highly palatable to stock and have a high nutritional value. Browsed extensively by cattle, sheep, and goats, especially when other forage is scarce; has been known in a few instances to poison sheep, and concentrated feeding may cause scours in cattle.

Atriplex collina, see *Atriplex confertifolia.*

Atriplex confertifolia (Torr. and Frem.) Wats. **Shadscale.**

Obione confertifolia Torr. and Frem., *A. collina* Woot. and Standl., *A. subconferta* Rydb.

Range: 8, 9, 10, 11, 15, 16.
Site: Dry, sun.
Fruit: Achene, available in September.

A small, spiny, rigid, dioecious, thickly-branched, densely clump-forming shrub; may occur on alkaline soil to pH 8.0; about 15,000 seeds per pound.

Observations: Three species of birds; California mule deer. Of great importance as browse for sheep and, to some extent, cattle; spines often interfere with browsing by cattle.

Atriplex garrettii, see *Atriplex canescens.*

Atriplex hymenelytra (Torr.) Wats. **Desert holly.**

Obione hymenelytra Torr.

Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small, compact, rounded, dioecious evergreen shrub; in demand for Christmas decorations. Apparently not browsed.

Atriplex lentiformis (Torr.) Wats. **Lenscale.**

Obione lentiformis Torr.

Range: 3, 9, 10, 11.
Site: Dry, sun.
Fruit: Achene, available September–October.

A large dioecious or rarely monoecious shrub; branches wide-spreading; foliage very thick and dense; rapid growing; usually occurs on alkaline soil; about 412,000 seeds per pound.

Observations: Fairly important as browse for mule deer; of great importance as a cover for wildlife. Much browsed by cattle, especially from December to July, when other feed is scarce.

Atriplex linearis, see *Atriplex canescens.*

Atriplex macropoda, see *Atriplex canescens.*

Atriplex orbicularis, see *Atriplex breweri.*

Atriplex parryi Wats. **Parry saltbush.**

Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small, spiny, rigid, dioecious shrub; occurs on alkaline soil.

Atriplex polycarpa (Torr.) Wats. **Cattle spinach.**

Obione polycarpa Torr.

Range: 3, 9, 10, 11.
Site: Dry, sun.
Fruit: Achene, available in October.

A small to large dioecious shrub; intricately and much branched; leaves early deciduous; a most important food of *Eutettix tenella*, the beet leafhopper, an insect carrying curly top disease of sugar beets; will grow on alkaline, but generally occurs on the richest of the desert soils; sometimes fruits abundantly when only 1 foot high; withstands up to 3 percent salt content of soil; germination of seed 30–60 percent.

Stomach records: California jack rabbit. Of great importance as browse for stock, especially since it so often occurs with unpalatable species; killed by excessive browsing.

Atriplex spinifera MacBr. **Spinescale.**
Range: 3, 10.
Site: Dry, sun.
Fruit: Achene.

A small to large, spinescent, dioecious shrub; broader leaves deciduous during the summer; found on moderately alkaline soil; important winter-food plant of *Eutettix tenella*, the beet leafhopper, an insect carrying the curly top disease of sugar beets.

Occasionally browsed by sheep.

Atriplex subconferta, see *Atriplex confertifolia.*

Atriplex torreyi Wats. **Torrey lenscale.**
A. lentiformis torreyi (Wats.) Hall and Clem.
Range: 9, 10.
Site: Dry, sun.
Fruit: Achene.

A small, spiny, dioecious shrub; occurs on alkaline soil.

Audibertia capitata, see *Salvia mohavensis.*

Audibertia incana, see *Salvia carnosa.*

Audibertia pachystachya, see *Salvia pachyphylla.*

Audibertia polystachya, see *Salvia apiana.*

Audibertia stachyoides, see *Salvia mellifera.*

Audibertiella incana, see *Salvia carnosa.*

Ayenia microphylla Gray.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Pod, available in September.

A small, much-branched shrub with very small leaves.

Ayenia pusilla L.
Range: 11, 17, 30.
Site: Dry, sun.
Fruit: Capsule.

A small, often prostrate shrub; often occurs in sand.
Observations: Gambel quail.

Azalea alabamense, see *Rhododendron alabamense.*

Azalea albiflora, see *Rhododendron albiflorum.*

Azalea arborescens, see *Rhododendron arborescens.*

Azalea atlantica, see *Rhododendron atlanticum.*

Azalea austrina, see *Rhododendron austrinum.*

Azalea calendulacea, see *Rhododendron calendulaceum.*

Azalea californica, see *Rhododendron occidentale.*

Azalea canescens, see *Rhododendron canescens* and *R. roseum.*

Azalea lapponica, see *Rhododendron lapponicum.*

Azalea lutea, see *Rhododendron calendulaceum.*

Azalea nudiflora, see *Rhododendron nudiflorum.*

Azalea oblongifolia, see *Rhododendron oblongifolium.*

Azalea occidentalis, see *Rhododendron occidentale.*

Azalea pilosa, see *Menziesia pilosa.*

Azalea prinophylla, see *Rhododendron roseum.*

Azalea prunifolia, see *Rhododendron prunifolium.*

Azalea rosea, see *Rhododendron roseum.*

Azalea serrulata, see *Rhododendron serrulatum.*

Azalea speciosa, see *Rhododendron speciosum.*

Azalea vaseyi, see *Rhododendron vaseyi.*

Azalea viscosa, see *Rhododendron viscosum.*

Azaleastrum albiflorum, see *Rhododendron albiflorum.*

Baccharis spp.

Dioecious shrubs usually growing in neutral soil; propagation is by seed sown in fall or spring or by soft or hard wood cuttings; the seed is hard-coated and may need treatment before sowing.

Baccharis angustifolia, see also *Baccharis neglecta.*

Baccharis angustifolia Michx. **False-willow.**
Range: 20, 29, 30.
Site: Moist, sun.
Fruit: Achene.

A small to large shrub; flowers in the fall, or all year southward; often grows near or in brackish marshes.

Baccharis consanguinea, see *Baccharis pilularis.*

Baccharis emoryi Gray. **Waterwillow.**
Range: 5, 8, 9, 10, 11, 16, 17.
Site: Dry, well-drained, or more commonly moist, sun.
Fruit: Achene.

A large, loosely-branched shrub; grazed by livestock in summer and fall in southeastern Arizona.

Baccharis glomeruliflora Pers.
Range: 29, 30.
Site: Moist, sun.
Fruit: Achene.

A large shrub; flowers fall to winter or all year; ordinarily occurs in salt marshes and swamps.

Baccharis glutinosa Pers. **Seepwillow.**
Range: 5, 9, 10, 11, 16, 17.
Site: Well-drained, moist, sun.
Fruit: Achene.

A small to large, thicket-forming shrub; stems slender, erect, or straggling; sometimes only herbaceous; root system deep and wide-spreading; has been recommended for erosion control; readily propagated by cuttings.

Baccharis halimifolia L. **Groundsel tree.**
Range: 17, 20, 27, 28, 29, 30.
Site: Moist, sun.
Fruit: Achene, available November–December.

A small to large, much-branched shrub; flowers August–October; may occur in salt marshes.

Observations: Captive marsh rabbit.

Baccharis neglecta Britt.
B. angustifolia Gray, not Michx.
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Achene.

A small evergreen shrub; flowers July–September; often occurs in saline soil; grows in sandy and other soils; invades abandoned farm lands.

Baccharis pilularis DC. **Kidneywort**
B. consanguinea DC.
Range: 1, 5.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small to large evergreen shrub; flowers August–October; usually colony-forming; certain forms are prostate-spreading; has been observed to pioneer in gullies; grows on sandy or other soils; foliage very dense; has been recommended for sand-dune fixation.

Stomach records: California quail. *Observations:* California mule deer.

Baccharis pteronioides, see *Baccharis ramulosa.*

Baccharis ramulosa Gray. **Yerba-de-pasmo.**
B. pteronioides DC.
Range: 11, 14.
Site: Dry, sun.
Fruit: Achene.

A small to large dioecious shrub; rarely grazed by stock except on overgrazed range; poisonous to sheep.

Baccharis salicina Torr. and Gray. **Willow baccharis.**
Range: 11, 15, 16.
Site: Moist, sun.
Fruit: Achene, available in August.

A large shrub; flowers May–July and occurs in saline soil.

Baccharis sarothroides Gray. **Rosinbrush.**
Range: 5, 10, 11.
Site: Dry, well-drained, moist, sun.
Fruit: Achene.

A small to large, broomlike, much-branched shrub with few leaves. Not palatable to livestock.

Baccharis viminea DC. **Mulefat.**
Range: 3, 5, 9, 10.
Site: Well-drained, moist, sun.
Fruit: Achene.

A large, loosely-branched shrub; flowers July–August.
Observations: California mule deer.

Batodendron arboreum, see *Vaccinium arboreum.*

Bebbia juncea (Benth.) Greene.
Carphephorus junceus Benth.
Range: 5, 9, 10, 11.
Site: Dry, well-drained, moist, sun.
Fruit: Achene.

A small to large shrub with rushlike branches.

Befaria racemosa Vent. **Tarflower.**
Range: 29, 30.
Site: Well-drained, sun, shade.
Fruit: Capsule.

A small to large evergreen shrub; flowers spring–fall; very ornamental in flower.

Beloperone californica Benth. **Chuperosa.**
Range: 10, 11.
Site: Well-drained, moist, sun.
Fruit: Capsule, available in April.

A small, spreading shrub; leafless in dry seasons; the capsules, which break open violently, are sometimes infested with seed-destroying larvae.
Observations: Very attractive to hummingbirds. Locally browsed by livestock.

Benzoin aestivale (L.) Nees. **Spicebush.**
Range: 20, 22, 24, 25, 26, 27, 28, 29.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available August–September, earlier southward, persistent or not.

A large, bushy shrub; flowers March–May; usually occurs in slightly acid soil; a rich soil species but often persistent in clearings; propagated by seeds sown as soon as ripe; fruit crops ordinarily light, locally heavy.
Stomach records: Seventeen species of birds, including ruffed grouse, bobwhite, and ring-necked pheasant; opossum. *Observations:* Seven species of birds; cottontail rabbit, marsh rabbit, white-tailed deer.

Benzoin melissaefolium (Walt.) Nees. **Southern spicebush.**
Range: 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe, available September–October.

A small to large shrub; very showy in the February–March flowering season.
Observations: Marsh rabbit.

Berberis spp. **Barberries.**

Certain quarantines apply to the species here listed except *B. thunbergii*, since they are secondary hosts for the black stem rust of grains. Although species are individually characterized as immune or susceptible to the disease, Federal quarantine officials should always be consulted before the species are used, planted, or shipped.

Stomach records (in addition to specific records): Ten species of birds, including ruffed grouse and ring-necked pheasant; gray-sided jack rabbit. *Observations* (in addition to specific records): Six species of birds; jack rabbit.

Berberis aquifolium Pursh. (pl. 4, *D*). **Oregon-grape.**

Mahonia aquifolium (Pursh) Nutt., *Odostemon aquifolius* (Pursh) Rydb., *Odostemon nutkanus* Rydb.

Range: 1, 2, 4, 6, 7, 11, 12, 13, 14, 15, 16.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available September–October.

A small to large evergreen shrub with very thick foliage; flowers April–May; several varieties in cultivation; fairly, but not completely, resistant to black stem rust.

Stomach records: Three species of birds, including ruffed grouse and dusky grouse; mountain sheep. *Observations:* Rocky Mountain black-tailed deer.

Berberis californicum Jeps. **California hollygrape.**

Odostemon dictyotus Abrams.

Range: 3, 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small to large evergreen shrub; slightly susceptible to black stem rust.

Observations: Of slight importance as browse for mule deer.

Berberis canadensis Pursh. **American barberry.**

Range: 25, 27, 28.
Site: Dry, well-drained, sun.
Fruit: Berry; available in September, long persistent.

A small to large, spiny shrub; flowers in June; occurs on limestone, sandstone, or acid soils; susceptible to black stem rust.

Berberis fendleri Gray. **Fendler barberry.**

Range: 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Berry, available in September.

A small to large, spiny shrub; flowers May–June; susceptible to black stem rust.

Berberis fremontii Torr. **Fremont hollygrape.**

Mahonia fremontii (Torr.) Fedde, *Odostemon fremontii* (Torr.) Abrams.

Range: 9, 10, 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Berry, available August–September.

A small to large evergreen shrub; flowers May–June; often forms dense clumps; very tolerant of arid conditions of soil and atmosphere; susceptible to black stem rust; seed germination 90 percent or less.

Stomach records: Black-tailed deer. *Observations:* Mule deer, New Mexico black bear.

Berberis haematocarpa Woot. **Red hollygrape.**

Odostemon haematocarpus (Woot.) Heller, *Mahonia haematocarpa* Fedde.

Range: 10, 11, 14.
Site: Dry, sun.
Fruit: Berry, available in August.

A small to large evergreen shrub; susceptible to black stem rust; about 103,000 seeds per pound.

Observations: Numerous birds, including Gambel quail; mule deer.

Berberis japonica, see *Berberis thunbergii*.

Berberis nana, see *Berberis repens*.

Berberis nervosa Pursh. (pl. 1, *B*). **Oregon-grape.**
Mahonia nervosa (Pursh) Nutt., *Odostemon nervosus* Rydb.
Range: 1, 2, 4, 12.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available July–August.

A small evergreen shrub; flowers May–June; spreads by creeping rootstocks to form thickets; resistant to black stem rust.

Observations: Rocky Mountain black-tailed deer.

Berberis nevinii Gray. **Nevin hollygrape.**
Mahonia nevinii (Gray) Fedde, *Odostemon nevinii* (Gray) Abrams.
Range: 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small to large evergreen shrub; occurs on sand, clay loam, and other soils; at first loosely branched, later more compact; root system shallow; drought resistant; rare and local; susceptible to black stem rust.

Berberis pinnata Lag. **Wavyleaf hollygrape.**
Mahonia pinnata Fedde, *Mahonia fascicularis* DC., *Odostemon fascicularis* (DC.) Abrams.
Range: 1, 3, 5.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small to large evergreen shrub with thick foliage; preliminary tests indicate that this species is resistant to black stem rust. Of some importance as a honey plant.

Berberis pumila Greene. **Dwarf hollygrape.**
Mahonia pumila (Greene) Fedde, *Odostemon pumilus* Heller.
Range: 4.
Site: Well-drained, sun.
Fruit: Berry.

A small evergreen shrub; occurs from 3,000–5,000 feet; susceptibility to attack of black stem rust uncertain, although apparently resistant.

Berberis repens Lindl. **Creeping hollygrape.**
Odostemon repens (Lindl.) Cockerell, *Mahonia repens* (Lindl.) Don, *Berberis nana* Greene.
Range: 4, 5, 7, 9, 11, 12, 13, 14, 15, 16.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available in September.

A small evergreen shrub; flowers in May; the rhizomes produce shoots and deep roots at intervals; resistant to black stem rust.

Stomach records: Black-tailed deer, plains white-tailed deer. Reputed to be poisonous to stock but probably not very seriously so.

Berberis sinensis, see *Berberis thunbergii.*

Berberis swaseyi Buckl. **Blue agarita.**
Mahonia swaseyi Fedde.
Range: 16.
Site: Dry, well-drained, sun.
Fruit: Berry, available May–June.

A small evergreen shrub; flowers in May; grows on many soils, including limestone; resistant to cold and drought; berries large, borne abundantly almost every year; very ornamental; a good hedge plant; susceptible to black stem rust.

Berberis thunbergii DC. **Thunberg barberry.**
B. japonica, B. sinensis of some.
Range: 1, 2, 4, 21, 23, 24, 25, 27, 28, 29.
Site: Well-drained, sun.
Fruit: Berry; available in August, persistent all year round.

A small to large, somewhat straggling, spiny shrub; native of Japan, but more or less naturalized in the regions indicated; evergreen southward; grows in many kinds of soils; has not demonstrated its ability to compete with native vegetation, including grasses; on dry banks has been repeatedly observed to die gradually; branches root where they touch the ground; not subject to black stem rust and not under quarantine; berries soften over winter and become more available to birds; much cultivated, and many cultivated varieties known; 25,000–28,000 seeds per pound, germination 80 percent, about 4,000 usable plants per pound of seed.

Stomach records: Ruffed grouse. *Observations:* Seven species of birds, including ring-necked pheasant, ruffed grouse (of value during winter), and bobwhite; cottontail rabbit.

Berberis trifoliolata Moric. **Agarita.**
Odostemon trifoliolatus (Moric.) Heller, *Mahonia trifoliolata* Fedde,
Range: 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Berry, available April–May.

A small to large evergreen shrub; thicket forming; occurs on gravelly and other soils; fruit edible; susceptible to black stem rust. A good honey plant.

Berberis vulgaris L. **European barberry.**
Range: 22, 27.
Site: Well-drained, sun.
Fruit: Berry; available August–September, persistent through the winter.

A small to large shrub introduced from Europe but naturalized in the regions indicated; much cultivated, and many varieties known; most susceptible of all species to the black stem rust; being eradicated in some areas.

Stomach records: Six species of birds, including ruffed grouse and bobwhite. *Observations:* Ring-necked pheasant, mockingbird.

Berberis wilcoxii Kearn.
Odostemon wilcoxii (Kearn.) Heller.
Range: 10, 11.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small shrub; has not been tested for susceptibility to black stem rust.

Berchemia scandens (Hill) Trel. **Rattan vine.**
Range: 20, 25, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe, available July–October.

A vigorous, much-branched vine; flowers March–June; occurs in sandy and other soils.

Stomach records: 14 species of birds, including wood duck, mallard, bobwhite, and turkey. *Observations:* Much eaten by migratory birds.

Bernardia myricaefolia (Scheele) Wats. **Myrtle croton.**
Tyria myricaefolia Scheele.
Range: 10, 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Capsule.

A small to large shrub; flowers in April; will grow under extremely adverse conditions. Eaten at times by very hungry stock.

Berthelotia sericea, see *Pluchea sericea*.

Betula spp. **Birches.**

Trees or shrubs; generally short-lived; propagation is by seeds sown as soon as ripe or stored dry and after stratification at 32°–50° F., for 6 weeks, planted in spring.

Stomach records (in addition to specific records): Twelve species of birds, including gray and eastern ruffed grouse, ptarmigan, sharp-tailed grouse, and woodcock; composed 0.8 percent of entire fall food of prairie chickens in Wisconsin, 0.73 percent of entire fall food of sharp-tailed grouse in Wisconsin, 46.9 percent of all winter food of northern sharp-tailed grouse in Ontario and Quebec, 12.26 percent of winter food of ruffed grouse in New York, and 5.6 percent of winter food of ruffed grouse in the northeastern United States; northern white-tailed deer, plains white-tailed deer. *Observations* (in addition to specific records): Twenty-one species of birds, including spruce grouse, ptarmigan, sharp-tailed grouse; staple winter food of greater prairie chicken, pinnated grouse, and ruffed grouse; important food of snowshoe hare, porcupine; an important food of beaver where *Populus* is lacking. The western species are browsed fairly well by livestock.

Betula alleghaniensis, see *Betula lutea.*

Betula coerulea Blanch. **Blueleaf birch.**
B. pendula Fern., not Roth.
Range: 15, 18, 21, 23, 24, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Small samara or nutlet, available September–October.

A large tree.

Betula cordifolia, see *Betula papyrifera.*

Betula fontinalis Sarg. **Red birch.**
B. occidentalis Nutt., not Hook., *B. utahensis* Britt., *B. microphylla* Bunge.
Range: 4, 7, 8, 9, 12, 13, 14, 15.
Site: Well-drained, moist, sun.
Fruit: Small samara or nutlet.

A small to rarely large tree; fair to good browse for sheep and goats; about 1,134,000 seeds per pound.

Var. *piperi* (Britt.) Sarg., (*B. piperi* Britt.) is smaller than the species, occurs in region 7, and is clump-forming.

Betula glandulifera, see *Betula pumila.*

Betula glandulosa Michx. **Bog birch.**
B. hallii Howell.
Range: 2, 4, 12, 13, 15, 23, 24, 26.
Site: Wet, sun.
Fruit: Small samara or nutlet.

A small to large shrub; usually occurs in sphagnum bogs.

Observations: White-tailed ptarmigan, northern sharp-tailed grouse, greater prairie chicken. Palatability good for cattle and sheep in most western sections, but plants are often inaccessible because of their occurrence in bogs.

Betula hallii, see *Betula glandulosa.*

Betula lenta L. **Sweet birch.**
Range: 22, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Small samara or nutlet, available September–October.

A large tree with open foliage; rapid growing when young, later slower; long-lived; root system fibrous, deep, and spreading; not fire resistant; windfirm; little attacked by disease except in old age; rarely attacked by insects; appears to flourish best in association with other species; wood used commercially to some extent; oil of wintergreen, produced by distillation of the leaves, is of importance commercially; about 500,000 seeds per pound, germination about 26 percent.

Stomach records: Ruffed grouse, greater prairie chicken. *Observations:* Redpoll, sharp-tailed grouse; important food of white-tailed deer, moose, cottontail rabbit.

Betula lutea Michx. f. **Yellow birch.**
B. alleghaniensis Britt.
Range: 21, 22, 23, 24, 25, 26, 27, 28.
Site: Well-drained, moist, sun, shade.
Fruit: Small samara or nutlet, available September–October.

A large tree; rapid growing, especially when young; moderately long-lived; root system widespread; taproot usually developed in a lateral direction; not fire resistant; wood of importance commercially; 400,000–440,000 seeds per pound.

Stomach records: Merganser, ruffed grouse. *Observations:* Seven species of birds, including sharp-tailed grouse, ruffed grouse, prairie chicken; important food of white-tailed deer; red squirrel, cottontail rabbit, moose.

Betula microphylla, see *Betula fontinalis.*

Betula montanensis, see *Betula papyrifera.*

Betula nigra L. **River birch.**
Range: 20, 22, 23, 25, 26, 27, 28, 29.
Site: Moist, sun.
Fruit: Small samara or nutlet, available July–September.

A large tree with open foliage; rapid growing when young; short-lived; little attacked by insects or disease; coppices when cut; wood used commercially to some extent.

Stomach records: Ruffed grouse. *Observations:* Five species of birds including ruffed grouse and wild turkey; white-tailed deer.

Betula occidentalis, see *Betula fontinalis* and *B. papyrifera.*

Betula papyrifera Marsh. **Paper birch.**
B. alba papyrifera (Marsh) Spach.
Range: 12, 13, 15, 18, 21, 22, 23, 24, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Small samara or nutlet, available August–September.

A large, short-lived tree; rapid growing when young, later slower; root system shallow, superficial; a pioneer on burned-over areas; free from insects and disease; easily fire-damaged; wood used commercially to some extent; about 700,000 seeds per pound, germination about 21 percent, seed vitality transient.

Var. *subcordata* (Rydb.) Sarg., (*B. subcordata* Rydb.), the paper birch, occurs in region 12. Var. *cordifolia* (Regel) Fern., (*B. cordifolia* Regel) occurs in regions 18, 21, 23, 24, 26, and 27. Var. *occidentalis* (Hook.) Sarg., (*B. occidentalis* Hook.), the western paper birch occurs in regions 1, 2, and 12. Var. *montanensis* (Butler) Sarg., (*B. montanensis* Butler) occurs in region 12. Var. *minor* (Tuckerm.) Fern., (*B. papyracea* var. Tuckerm.), is a shrub occurring in regions 23 and 27, strictly in bogs.

Stomach records: Ruffed grouse, sharp-tailed grouse, *Observations:* Redpoll, preferred food of ruffed grouse in Maine; snowshoe hare; important food of moose on Isle Royale; sparingly browsed by northern white-tailed deer.

Betula pendula, see *Betula coerulea.*

Betula piperi, see *Betula fontinalis.*

Betula populifolia Marsh. **Gray birch.**
Range: 24, 26, 27, 28.
Site: Dry, well-drained, moist, sun.
Fruit: Small samara or nutlet, available in September.

A small to large short-lived tree; fairly rapid growing; free from insects and disease; easily storm-damaged; coppices freely when cut; wood used commercially to some extent; generally occurs in poor sandy or gravelly soils.

Stomach records: Three species of birds including ruffed grouse. *Observations:* Five species of birds; white-tailed deer.

Betula pumila L. **Swamp birch.**
Range: 18, 21, 22, 23, 24, 26, 27.
Site: Moist, sun.
Fruit: Small samara or nutlet, available September–October.

A small to large shrub.

Var. *glandulifera* Regel (*B. glandulifera* (Regel) Butter), is a shrub occurring in regions 18, 21, 23, and 24.

Betula subcordata, see *Betula papyrifera.*

Betula utahensis, see *Betula fontinalis.*

Bigelovia acradenius, see *Aplapappus acradenius.*

Bigelovia arborescens, see *Aplopappus arborescens.*

Bigelovia brachylepis, see *Aplopappus propinquus.*

Bigelovia depressa, see *Chrysothamnus depressus.*

Bigelovia douglasii, see *Chrysothamnus viscidiflorus.*

Bigelovia greenei, see *Chrysothamnus greenei.*

Bigelovia nelsonii, see *Aplopappus laricifolius.*

Bigelovia paniculata, see *Chrysothamnus paniculatus.*

Bigelovia parishii, see *Aplopappus parishii.*

Bigelovia parryi, see *Chrysothamnus parryi.*

Bigelovia pulchella, see *Chrysothamnus pulchellus.*

Bigelovia spathulata, see *Aplopappus cuneatus.*

Bignonia capreolata L. **Crossvine.**
Anisostichus capreolata (L.) Bur., *Bignonia crucigera* L., in part.
Range: 25, 28, 29, 30.
Site: Moist, well-drained, sun, shade.
Fruit: Capsule.

An evergreen, tree-climbing vine; blooms April–June; very handsome in cultivation; usually occurs in rich soil.

Bignonia crucigera, see *Bignonia capreolata.*

Bignonia linearis, see *Chilopsis linearis.*

Bignonia radicans, see *Campsis radicans.*

Bignonia sempervirens, see *Gelsemium sempervirens.*

Bignonia stans, see *Tecoma stans.*

Biltia vaseyi, see *Rhododendron vaseyi.*

Borrichia frutescens (L.) DC. **Sea oxeye.**
Buphthalmium frutescens L.
Range: 17, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Achene.

A small shrub; blooms July–September, or all year southward; may occur in sandy soil, salt marshes, or on prairies.

Brahea minima, see *Sabal minor.*

Brayodendron texanum, see *Diospyros texana.*

Brickellia arguta, see *Brickellia atractyloides.*

Brickellia atractyloides Gray.
B. venulosus arguta (Robins.) Jeps., *B. arguta* Robins., *Coleosanthus atractyloides* (Gray) Kuntze, *C. venulosus* Nels.
Range: 9, 10.
Site: Dry, sun.
Fruit: Achene.

A small, much-branched shrub; flowers April–June.

Brickellia desertorum Cov. **Desert brickellbush.**
Coleosanthus desertorum Cov.
Range: 9, 10.
Site: Dry, sun.
Fruit: Achene.

A small, intricately-branched shrub; blooms October–November.

Brickellia frutescens Gray. **Rigid brickellbush.**
Coleosanthus frutescens (Gray) Kuntze.
Range: 5, 10.
Site: Dry, sun.
Fruit: Achene.

A small, rigid, spinose shrub; blooms April–May.

Brickellia grayana, see *Brickellia microphylla.*

Brickellia knappiana Drew.
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small to large, willowlike, slender shrub; flowers August–September; a rare species.

Brickellia laciniata Gray.
Coleosanthus laciniatus (Gray) Kuntze.
Range: 11.
Site: Dry, sun.
Fruit: Achene.

A small shrub.

Brickellia microphylla (Nutt.) Gray. **Littleleaf brickellbush.**
Bulbostylis microphylla Nutt., *Brickellia grayana* Hieron., *Coleosanthus microphyllus* (Nutt.), Kuntze, *C. cedrosensis* Greene.
Range: 8, 9, 10, 12.
Site: Dry, sun.
Fruit: Achene.

A small shrub or occasionally not entirely woody; flowers August–October; usually occurs in sand.

Brickellia multiflora Kell.
Coleosanthus multiflorus (Kell.) Kuntze.
Range: 4, 5, 10.
Site: Dry, sun.
Fruit: Achene.

A large shrub; usually occurs in sand.

Brickellia nevinii Gray.
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small shrub with thick foliage.

Brickellia squamulosa Gray.
Coleosanthus squamulosus (Gray) Kuntze.
Range: 11.
Site: Dry, sun.
Fruit: Achene.

A small shrub.

Brongniartia minutifolia Wats.
Range: 11.
Site: Dry, sun.
Fruit: Legume.

A small, much-branched shrub.

Broussonetia papyrifera (L.) Vent. **Paper mulberry.**
Papyrius papyrifera (L.) Kuntze.
Range: 17, 20, 25, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Compound drupe, available in September.

A large shrub to small or large dioecious tree; flowers in May; naturalized from Japan and commonly escaped in the regions indicated; rapid growing; root sprouts produced copiously; very drought resistant; has spread very commonly in gullies or occasionally in moist, shady places; fruits are borne seldom; about 200,000 seeds per pound.

Stomach records: Three species of birds.

Broussonetia secundiflora, see *Sophora secundiflora.*

Brunnichia cirrhosa Banks. **Buckwheat-vine.**
Range: 25, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Achene, available September–October, occasionally persistent all winter.

A vine; blooms July–August; has colonized railroad embankments in the South.

Stomach records: Mallard.

Bryanthus taxifolius, see *Phyllodoce caerulea.*

Buddleia humboldtiana Roem. and Schult.
Range: 17.
Site: Dry, sun.
Fruit: Capsule.

A shrub.

Buddleia marrubiifolia Benth. **Woolly butterflybush.**
Range: 11, 17.
Site: Well-drained, sun.
Fruit: Capsule.

A small shrub; may possibly furnish some browse for livestock.

Buddleia racemosa Torr.
Range: 11, 17, 20.
Site: Dry, sun.
Fruit: Capsule.
A small, loosely-branched shrub; flowers spring-summer.

Buddleia scordioides H. B. K.
Range: 11, 17.
Site: Dry, sun.
Fruit: Capsule.
A small shrub; palatability fairly good to good for sheep, goats, and cattle.

Buddleia sessiliflora H. B. K.
Range: 10, 11.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small or large shrub to small tree.

Buddleia utahensis Cov.
Range: 9, 10.
Site: Dry, sun.
Fruit: Capsule.
A small shrub; possibly furnishes some browse for livestock.

Bulbostylis microphylla, see *Brickellia microphylla.*

Bumelia angustifolia see *Bumelia spiniflora.*

Bumelia cassinifolia Small. **Buckthorn.**
Range: 29, 30.
Site: Well-drained, sun, shade.
Fruit: Drupe.
Commonly a large shrub or small to large tree; spiny; often occurs in sandy woods.

Bumelia lanuginosa (Michx.) Pers. **Woolly buckthorn.**
Sideroxylon lanuginosa Michx.
Range: 11, 14, 17, 19, 20, 22, 25, 29, 30, 31, 32.
Site: Dry, well-drained, sun.
Fruit: Drupe; available September–November, sometimes persistent.
A large shrub to small or large spiny tree, evergreen southward; flowers June–July; somewhat thicket forming, especially westward; occurs on rocky, gravelly, sandy, and other soils; 3,500–6,700 seeds per pound.
Observations: Curve-billed thrasher, Sennett thrasher.

Bumelia lucida Small. **Shining bumelia.**
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Drupe.
A large shrub to small tree; evergreen, thorny; branches rigid.

Bumelia lycioides (L.) Pers. **Southern buckthorn.**
Range: 17, 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe, available September–November.
A large shrub to small or large tree; semievergreen; unarmed or spiny; flowers June–August; coppices when cut.
Stomach records: Lesser scaup. Browsed to some extent by livestock.

Bumelia monticola Buckl. **Mountain buckthorn.**
Range: 11, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Drupe, available in September.
A large shrub to small or large tree; largest forms occur on best sites; spiny and straggling; flowers June–July; usually occurs on limestone soil.

Bumelia reclinata Vent.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Drupe.
A small to large, spiny evergreen shrub; may be erect or depressed; flowers spring–summer or the year round; often occurs on sand.

Bumelia schottii, see *Bumelia spiniflora.*

Bumelia spiniflora DC. **Saffron-plum.**
B. angustifolia Nutt., *B. schottii* Britt.
Range: 17, 31, 32.
Site: Well-drained, sun.
Fruit: Drupe, available April–May.

A large shrub to a small or rarely large tree; evergreen; flowers November–January; propagated by seed.

Bumelia tenax Willd. **Tough buckthorn.**
Range: 29, 30, 31, 32.
Site: Dry, well-drained, sun.
Fruit: Drupe, available September–November.

Most commonly a small to large shrub; sometimes a small to large tree; evergreen southward; flowers May–July; spiny or unarmed; may occur on sand.

Bumelia texana Buckl.
Range: 16, 17.
Site: Dry, sun.
Fruit: Drupe.

A large shrub to small tree; evergreen; branches rigid and thorny.

Buphthalmium frutescens, see *Borrichia frutescens.*

Bursera lonchophylla, see *Bursera odorata.*

Bursera odorata Brandeg.
B. lonchophylla Sprague and Riley, *B. tenuifolia* Rose, *B. purpusii* Brandeg., *Elaphrium covillei* Rose, *E. confusum* Rose, *E. brachypodum* Rose, *E. odoratum* (Brandeg.) Rose.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Drupe, resembling a capsule.

A small tree; usually occurs on calcareous soil.

Bursera microphylla Gray. **Elephant tree.**
Elaphrium microphyllum (Gray) Rose.
Range: 5, 10.
Site: Dry, sun.
Fruit: Drupe; resembling a capsule, available in October.

A large shrub to small or large tree; flowers in June.

Butneria fertilis, see *Calycanthus fertilis.*

Butneria florida, see *Calycanthus florida.*

Butneria mohri, see *Calycanthus mohri.*

Butneria nana, see *Calycanthus fertilis.*

Butneria occidentalis, see *Calycanthus occidentalis.*

Buxella brachycera, see *Gaylussacia brachycera.*

Buxus chinensis, see *Simmondsia chinensis.*

Calliandra chamaedrys, see *Calliandra eriophylla.*

Calliandra conferta, see *Calliandra eriophylla.*

Calliandra eriophylla Benth. **False-mesquite.**
C. chamaedrys Engelm., *C. conferta* Benth., *Anneslia eriophylla* (Benth.) Britt.
Range: 10, 11, 16, 17.
Site: Dry, sun.
Fruit: Legume, available May–August.

A small, somewhat prostrate, densely-branched shrub; occurs on sandy and other soils; flowers March–May; seed germination 64 percent.

Stomach records: Masked bobwhite, bobwhite, antelope jack rabbit. *Observations:* Gambel, scaled, and Mearn's quail. Highly palatable to livestock.

Callicarpa americana L. (pl. 5, *A*). **French mulberry.**
Range: 17, 20, 25, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berrylike drupe, available August–November.

A large, bushy shrub, or rarely somewhat viny; flowers June–July; commonly occurs in rich soil, but grows also in poor ones; may grow in sand, clay, loam, and other neutral soils; propagated by seed or cuttings, 85,000 seeds per pound, germination about 40 percent; about 10,000 usable plants per pound of seed.

Stomach records: 10 species of birds, including bobwhite. *Observations:* Five species of birds, including bobwhite; ranked as forty-first on the list of quail food plants of the southeastern United States; captive marsh rabbits.

Calligonum canescens, see *Atriplex canescens.*

Calycanthus fertilis Walt. **Mountain spicewood.**
C. nanus Loisel., *Butneria fertilis* (Walt.) Kearn., *B. nana* (Loisel.) Small.
Range: 27, 28, 29.
Site: Well-drained, moist, sun.
Fruit: Capsule; available in September, persistent through the winter.

A large shrub; flowers March–August; usually occurs on rich, nearly neutral soil; propagation is by seeds sown in spring. Considered deleterious to cattle.

Calycanthus floridus L. **Carolina allspice.**
Butneria florida (L.) Kearn.
Range: 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.

A large shrub; flowers April–August; usually occurs in rich, neutral soil; propagation is by seed sown in spring.

Calycanthus mohri Small.
Butneria mohri Small.
Range: 27.
Site: Well-drained, sun.
Fruit: Capsule.

A small to large shrub.

Calycanthus nanus, see *Calycanthus fertilis.*

Calycanthus occidentalis Hook. and Arn. **California sweetshrub.**
Butneria occidentalis (Hook. and Arn.) Greene.
Range: 4.
Site: Well-drained, sun.
Fruit: Capsule.

A small to large shrub; flowers June–August; occurs from 800 to 3,800 feet. *Observations:* Of slight importance as browse for mule deer. Reputed to be poisonous to stock, but this may be questionable.

Calycocarpum lyonii (Pursh) Nutt. **Cupseed.**
Menispermum lyonii Pursh.
Range: 22, 25, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available August–October.

A high-climbing and twining vine; flowers May–June; often for the most part herbaceous; fruit ripens irregularly; commonly climbs over bushes along stream banks.

Campsis radicans (L.) Seem. **Trumpetcreeper.**
Tecoma radicans (L.) Juss., *Bignonia radicans* (L.) DC.
Range: 20, 22, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule; available August–October or persistent through the winter.

An exceedingly rapid-growing tree-climbing vine; flowers all summer; somewhat herbaceous in cultivated fields where it is often considered a troublesome weed, especially southward; grows on coal-stripped lands in Illinois; said to be narcotic, but not known to be eaten by domestic animals; much cultivated and with several varieties known.

Canotia holacantha Torr. **Mohave thorn.**
Range: 10, 11.
Site: Dry, sun.
Fruit: Capsule.

A large shrub, or sometimes a small or large tree with rushlike branches; somewhat spinose; often occurs in pure stands of an acre or more; grows on gravelly or sandy soil. Worthless as forage for stock.

Capsicum baccatum L. **Chillipiquin.**
Range: 17, 20, 30.
Site: Well-drained, shade.
Fruit: Berry, available in September, long persistent.

A small to large shrub.

Carlowrightia arizonica Gray.
Range: 10.
Site: Dry, sun.
Fruit: Pod.

A small, wide-spreading shrub; cropped to some extent by sheep and cattle.

Carlowrightia linearifolia (Torr.) Gray.
Range: 11.
Site: Dry, sun.
Fruit: Pod.

A small shrub with small leaves; worthless as forage.

Carpenteria californica Torr.
Range: 4.
Site: Well-drained, sun.
Fruit: Capsule.

A small to large, many-stemmed, spreading evergreen shrub; flowers May–July; commonly cultivated.

Foliage very bitter, seldom grazed even by sheep.

Carphephorus junceus, see *Bebbia juncea.*

Carpinus caroliniana Walt. **Blue beech.**
Range: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Nutlet; available August–October, often persistent.

A small to large bushy tree; slow growing; rarely attacked by insects; wood very hard and durable, somewhat used commercially; propagated by seeds sown as soon as ripe; germination very irregular; about 300 usable plants per pound of seed.

Stomach records: Nine species of birds, including ruffed grouse, bobwhite, turkey, and sharp-tailed grouse; composed 4.08 percent of winter food of ruffed grouse in New York. *Observations:* Ring-necked pheasant, ruffed grouse, bobwhite; cottontail rabbit, white-tailed deer, gray squirrel.

Carya spp. **Hickories.**

Large trees; usually grow on neutral soil; propagation is by seed stratified and sown in spring; because of their long taproots they are ordinarily hard to transplant; will not stand much trampling by stock.

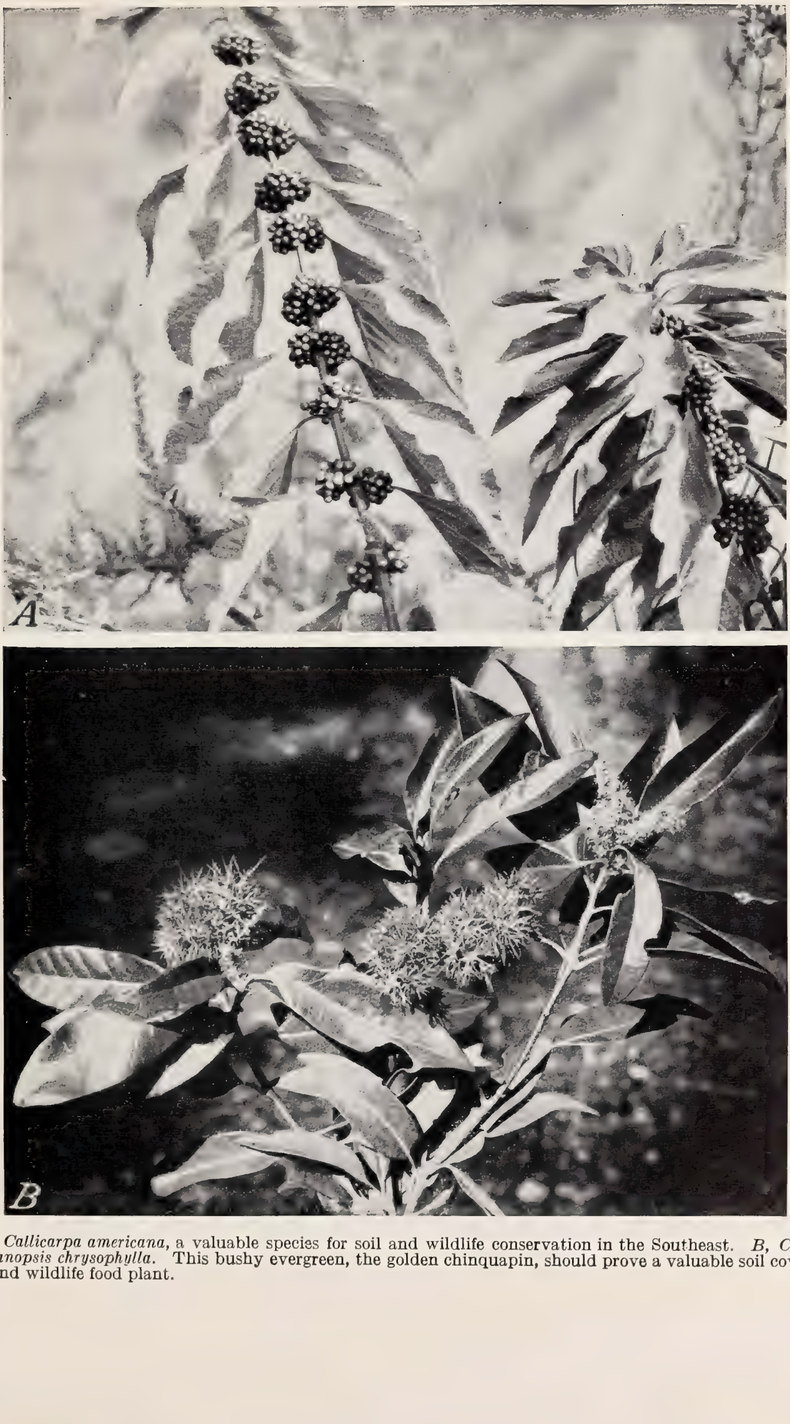
Stomach records (in addition to specific records): Eleven species of birds, including wood duck, mallard, ruffed grouse, bobwhite, turkey, ring-necked pheasant; gray fox, white-tailed deer. *Observations* (in addition to specific records): Four species of birds, including bobwhite; white-tailed deer, cottontail rabbit, and many squirrels; gray fox, red squirrel, southwestern chipmunk, gray squirrel, flying squirrel.

Carya alba, see also *Carya ovata.*

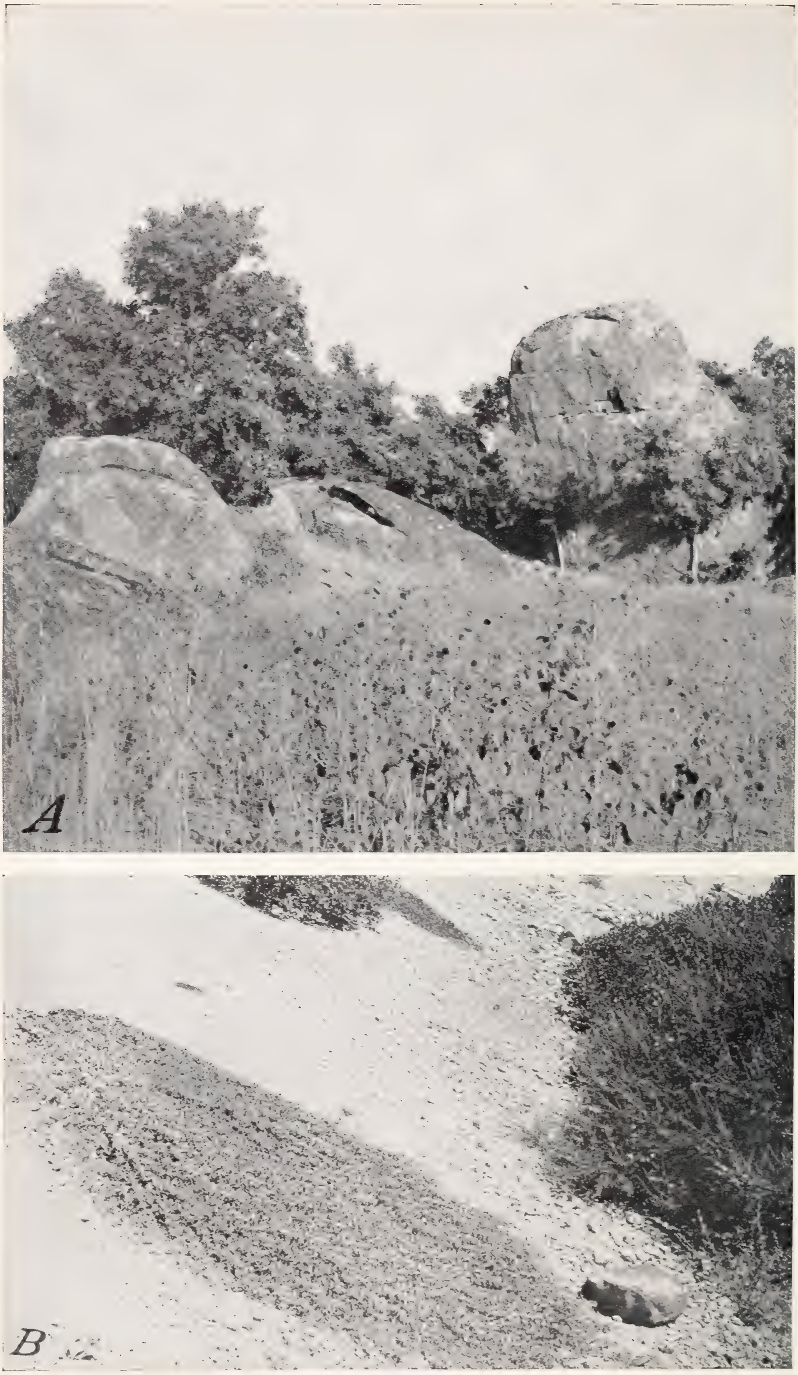
Carya alba (L.) Koch. **Mockernut hickory.**
Hicoria alba (L.) Britt., *C. tomentosa* (Lam.) Nutt.
Range: 20, 22, 24, 25, 27, 28, 29, 30.
Site: Well-drained, sun, shade.
Fruit: Nut; available September–November.

A large tree; taproot much developed; rapid growing when young, rather long-lived; generally occurs on richer soils; wind-firm; easily fire-damaged; much attacked by insects; stump and root sprouts produced freely; may occur on sandstone, chert, or igneous areas; wood of importance commercially; seed produced abundantly about every other year; 110 seeds per pound, germination about 85 percent; about 35 usable plants per pound of seed.

Observations: White-tailed deer.



A, *Callicarpa americana*, a valuable species for soil and wildlife conservation in the Southeast. *B*, *Castanopsis chrysophylla*. This bushy evergreen, the golden chinquapin, should prove a valuable soil cover and wildlife food plant.



A, *Celtis douglasii*. This hackberry, like others in the genus, thrives in extremely arid regions. Its value as cover in an otherwise barren country is very great. *B*, *Ceanothus prostratus* forms perfect cover on part of a dry railroad embankment.

Carya amara, see *Carya cordiformis.*

Carya aquatica (Michx. f.) Nutt. **Water hickory.**
Hicoria aquatica (Michx. f.) Britt.
Range: 20, 25, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Nut; available September–October.

A large tree; ordinarily grows in alluvial soil; taproot small, lateral roots well developed; wood of little importance commercially.

Stomach records: Wood duck, mallard.

Carya arkansana, see *Carya buckleyi.*

Carya buckleyi Durand. **Texas hickory.**
Hicoria buckleyi (Durand) Sudw.
Range: 16, 20, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Nut.

A large tree; occurs in sandy or other soils.

Var. *arkansana* (Sarg.) Ashe, (*C. arkansana* Sarg.) occurs also in region 25.

Carya carolinae-septentrionalis (Ashe) Engelm. and Graebn. **Southern shagbark hickory.**
Hicoria carolinae-septentrionalis Ashe.
Range: 27, 28, 29.
Site: Well-drained, sun.
Fruit: Nut.

A large tree; occurs on sandy, rocky, or rich soil.

Carya cordiformis (Wang.) Koch. **Bitternut hickory.**
Hicoria cordiformis (Wang.) Britt., *H. minima* (Marsh.) Britt., *C. amara* Nutt.
Range: 20, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Nut, available September–October.

A large tree; usually occurs on slightly acid, very fertile soil; the most rapid growing of all the hickories, especially when young, later slower; taproot and laterals well developed; long-lived; easily frost- and fire-damaged when young; stump and root sprouts produced; has been noted to be dying out in Indiana supposedly because of a root disease; attacked by hickory borer, otherwise generally free from insects and fungi; wood very tough, of some importance commercially; about 110 seeds per pound, germination 80–90 percent.

Observations: Cottontail rabbit; fruit claimed to be generally distasteful to wildlife.

Carya floridana Sarg. **Scrub hickory.**
Hicoria floridana (Sarg.) Sudw.
Range: 30, 31.
Site: Well-drained, sun.
Fruit: Nut.

A large shrub to small tree; usually occurs on sandy soil; fruit usually produced abundantly.

Carya glabra (Mill.) Sweet. **Pignut hickory.**
C. porcina Nutt., *Juglans glabra* Mill., *Hicoria glabra* (Mill.) Britt.
Range: 20, 22, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Nut, available September–October.

A large tree; ordinarily occurs in fertile, slightly acid soil; slow growing, long-lived; root system deep; wind-firm; easily frost- and fire-damaged; somewhat injured by bark beetles; root sprouts produced; often invades land after the virgin forest is cut to form pure stands; difficult to transplant; 210 seeds per pound, germination about 85 percent; about 70 usable plants per pound of seed.

Var. *megacarpa* (Sarg.) Sudw., (*C. megacarpa* Sarg.) has larger fruits and occurs within the range of the species.

Observations: Cottontail rabbit.

Carya illinoensis, see *Carya pecan.*

Carya laciniosa (Michx f.) Loud. **Big shellbark hickory.**
C. sulcata Nutt., *Hicoria laciniosa* (Michx. f.) Sarg., *H. sulcata* (Willd.) Britt.
Range: 22, 24, 25, 27, 28, 29.
Site: Well-drained, moist, sun, shade.
Fruit: Nut, available September–October.

A large tree; ordinarily occurs on fertile soils; taproot much developed; slow growing, long-lived; wind-firm; much injured by insects; root sprouts ordinarily grow faster than seedlings; wood valuable commercially; difficult to transplant.

Observations: Cottontail rabbit.

Carya leiodermis Sarg. **Pignut hickory.**
Hicoria leiodermis (Sarg.) Sudw.
Range: 29.
Site: Moist, sun.
Fruit: Nut, available September–October.

A large tree.

Carya megacarpa, see *Carya glabra.*

Carya microcarpa Nutt. **Little pignut hickory.**
Hicoria microcarpa (Nutt.) Britt., *H. ovata nuttallii* (Sarg.) Sudw.
Range: 22, 24, 25, 27, 28, 29.
Site: Well-drained, sun.
Fruit :Nut, available September–October.

A large tree; ordinarily occurs on rich soil.

Carya myristicaeformis (Michx. f.) Nutt. **Nutmeg hickory.**
Hicoria myristicaeformis (Michx. f.) Britt., *Juglans myristicaeformis* Michx. f., *H. fernowiana* Sudw.
Range: 20, 25, 29.
Site: Well-drained, sun.
Fruit: Nut, available September–October.

A large tree; taproot strongly developed; difficult to transplant. The Fernow hickory has recently been listed as distinct from this species; its range is, as yet, not clear.

Carya olivaeformis, see *Carya pecan.*

Carya ovalis (Wang.) Sarg. **Small pignut.**
Hicoria ovalis (Wang.) Sudw.
Range: 22, 25, 27, 28, 29.
Site: Well-drained, sun.
Fruit: Nut.

Six varieties are recognized, one of which extends the range of the species to region 24.

Carya ovata (Mill.) Koch. **Shagbark hickory.**
C. alba Nutt. not Koch, *Hicoria ovata* (Mill.) Britt., *H. carolinae-septentrionalis australis* Ashe, *Juglans ovata* Mill.
Range: 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Nut, available September–October.

A large, slow-growing, long-lived tree; taproot much developed; young trees easily frost-damaged; wind-firm; severely injured by fire; much attacked by insects; root sprouts decrease with age of trees; wood important commercially, tough, but not durable when exposed; difficult to transplant; often occurs in limestone hills; five recognized varieties occur within the range of the species; 80–90 seeds per pound, germination about 85 percent; about 30 usable plants per pound of seed.

Observations: Cottontail rabbit, white-tailed deer.

Carya pallida (Ashe) Engl. and Graebn. **Pignut hickory.**
C. glabra villosa (Sarg.) Robins., *Hicoria pallida* Ashe.
Range: 25, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Nut, available September–October.

A small to large tree; occurs on sterile, sandy, or rocky soil; wood used commercially.

Carya pecan (Marsh.) Engl. and Graebn. **Pecan.**
C. illinoensis (Wang.) Koch, *C. olivaeformis* Nutt., *Hicoria pecan* (Marsh.) Britt.
Range: 16, 20, 22, 25, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Nut, available September–October.

A large tree; taproot short, root system spreading; usually occurs on fertile soil; comparatively rapid growing (for a hickory), long-lived; ability to stump sprout decreases with age; easily frost-damaged; somewhat injured by bark beetles; wood much inferior to other hickories, unimportant commercially although somewhat used for fuel; nuts probably do not mature northward because of frost; difficult to transplant; most cultivated forms, of which there are about 100 named varieties, have larger nuts with thinner shells than the wild species; 100 seeds per pound, germination about 85 percent; about 35 usable plants per pound of seed; a hybrid between this and *C. laciniosa* is recognized as the Nussbaumer hickory and between this and *C. cordiformis* as Brown's hickory.

Stomach records: Six species of birds; opossum. *Observations:* Three species of birds including wild turkey; bassariscus, peccary.

Carya porcina, see *Carya glabra.*

Carya sulcata, see *Carya laciniosa.*

Carya texana DC. **Bitter pecan.**
Hicoria texana (Le Conte) Britt.
Range: 29, 30.
Site: Well-drained, moist, sun.
Fruit: Nut, available September–October.

A large tree.

Carya tomentosa, see *Carya alba.*

Carya villosa Schneid. **Pignut hickory.**
C. buckleyi villosa Sarg., *Hicoria villosa* (Sarg.) Ashe, *H. glabra villosa* Sarg.
Range: 20, 22, 25.
Site: Dry, well-drained, sun.
Fruit: Nut, available October–November.

A large, drought-resistant tree; occurs on sandy or other soils.

Caryopitis edulis, see *Pinus edulis.*

Caryopitis monophylla, see *Pinus monophylla.*

Cassandra calyculata, see *Chamaedaphne calyculata.*

Cassia armata Wats. **Senna.**
Xerocassia armata (Wats.) Britt. and Rose.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small, much-branched shrub, leafless most of the year; may occur on sandy or other soils.

Cassia covesii Gray. **Senna.**
Earleocassia covesii (Gray) Britt.
Range: 9, 10, 11.
Site: Dry, sun.
Fruit: Legume.

A small shrub; often only herbaceous in the eastern part of its range.

Cassia wislizenii Gray.
Palmerocassia wislizenii (Gray) Britt.
Range: 11.
Site: Dry, sun.
Fruit: Legume.

A small to large, much-branched, spreading shrub.

Cassiope hypnoides (L.) Don.
Range: 23, 24, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small, evergreen shrub; flowers June–July; procumbent and tufted, somewhat mosslike; occurs on alpine summits.

Cassiope mertensiana (Bong.) Don.
Andromeda mertensiana Bong.
Range: 1, 4, 12.
Site: Well-drained, sun.
Fruit: Capsule.

A low shrub; stems prostrate, more or less matted; occurs at high altitudes.
Stomach records: Mountain sheep.

Castanea spp.

The chinquapins are susceptible to the chestnut blight, although that disease has not been as destructive of them as of the chestnut; propagation is by seed sown in fall or spring.

Stomach records (in addition to specific records): Eastern flying squirrel, gray squirrel, red squirrel, eastern chipmunk. *Observations* (in addition to specific records): Bluejay, pileated woodpecker; opossum, white-tailed deer.

Castanea alabamensis Ashe. **Alabama chinquapin.**
Range: 29.
Site: Dry, well-drained, sun.
Fruit: Nut, available September–October.

A large tree.

Castanea alnifolia Nutt. **Dwarf chinquapin.**
C. nana Muhl.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Nut, available September–October.

A small shrub; occurs in sandy and other soils; forms great patches by means of stolons.

Castanea arkansana, see *Castanea ozarkensis.*

Castanea ashei Sudw. **Coastal chinquapin.**
C. pumila ashei Sudw.
Range: 28, 29, 30.
Site: Well-drained, sun.
Fruit: Nut, available in September.

A large shrub to small tree; usually occurs in sand. A form with more pointed leaves has been described as *C. margaretta* Ashe.

Castanea dentata (Marsh.) Borkh. **American chestnut.**
Range: 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Nut, available September–October.

A large tree, very nearly extinct through ravages of the chestnut blight; root system deep, taproot well developed.
Stomach records: Three species of birds, including bobwhite and wild turkey; white-tailed deer.

Castanea floridana (Sarg.) Ashe.
C. alnifolia floridana Sarg.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Nut, available in August.

A large shrub to small or large tree; often many-stemmed even when arborescent.

Castanea margaretta, see *Castanea ashei.*

Castanea nana, see *Castanea alnifolia.*

Castanea ozarkensis Ashe. **Ozark chinquapin.**
C. arkansana Ashe.
Range: 25.
Site: Dry, well-drained, sun.
Fruit: Nut.

A small to large tree, commonly several-stemmed.

Castanea pumila (L.) Mill. **Chinquapin.**
Range: 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Nut, available September–November.

A large shrub to small or large tree; grows in sand, loam, clay, and other soils; coppices freely when cut; wood used to some extent commercially; 250 seeds per pound, germination about 60 percent, about 50 usable plants per pound of seed.

Stomach records: Three species of birds.

Castanopsis spp. **Chinquapins.**

The species have been found experimentally susceptible to the chestnut blight. This disease is present in California in three commercial chestnut plantings where the burning of attacked individuals as a control measure is being actively pursued with success.

Observations (in addition to specific records): Allen's chipmunk, golden-mantled ground squirrel.

Castanopsis chrysophylla (Dougl.) DC. (pl. 5, *B*). **Golden chinquapin.**

Range: 1, 4, 6.
Site: Dry, well-drained, sun.
Fruit: Nut, available in September of the second season.

A small to large evergreen tree; thicket-forming; wood rarely used commercially; fruits sparingly.

Var. *minor* (Benth.) DC., the golden chinquapin, is a large shrub in region 4.

Observations: Of fair importance for mule deer.

Castanopsis sempervirens (Kell.) Dudl. **California chinquapin.**

C. chrysophylla minor Wats.
Range: 4, 5.
Site: Dry, well-drained, sun.
Fruit: Nut, available September–October of the second season.

A small to large, spreading evergreen shrub.

Observations: Bighorn. Seldom touched by livestock; concentrated feeding may result in poisoning.

Castela nicholsonii Hook. **Goatbush.**

Range: 11, 17.
Site: Dry, sun.
Fruit: Drupe.

A small, spiny, rigid shrub.

Castela texana (Torr. and Gray) Rose. **Goatbush.**

C. nicholsonii texana Torr. and Gray.
Range: 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Drupe.

A small to large, rigid, spinescent shrub; thicket-forming; resistant to cattle as a hedge.

Castilleja hololeuca Greene. **Bush paintbrush.**

Range: 5.
Site: Dry, sun.
Fruit: Capsule.

A small shrub.

Catalpa spp. **Catalpa.**

Propagation of all species is by seed sown in spring after stratification.

Catalpa bignonioides Walt. **Common catalpa.**

C. catalpa (L.) Karst.
Range: 22, 25, 27, 28, 29, 30.
Site: Well-drained, sun.
Fruit: A long capsule, available September to spring.

A large tree; flowers May–June; wood highly valued for fence posts. The original range is now uncertain, having been extended by plantings.

Catalpa catalpa, see *Catalpa bignonioides.*

Catalpa speciosa Engelm. **Hardy catalpa.**

Range: 21, 22, 23, 25, 29.
Site: Well-drained, moist, sun.
Fruit: A long capsule, available September to spring.

A large tree; flowers May–June; extensively planted and probably escaping in many places; rapid growing, relatively short-lived; easily injured by frost, storms, insects, and fungi; coppices freely; wood seldom used commercially although much used for fence posts; about 23,000 seeds per pound, germination about 80 percent; about 5,000 usable plants per pound of seed.

Caudoleucaena retusa, see *Leucaena retusa.*

Ceanothus spp. **Ceanothus.**

Generally large shrubs to small trees; ordinarily occur on more or less acid soil; nodules on the roots of the species assist in nitrogen fixation in the same manner as in the legumes; the deciduous forms are generally characteristic of drier soil and lower slopes; evergreen forms more characteristic of higher moisture slopes. Propagation is by seed treated with hot water followed by stratification as given for each species; seed can be germinated without any treatment, but low percentage of germination must be expected; many species can also be propagated by stem or root cuttings.

Stomach records (in addition to specific records) : 15 species of birds, including bobwhite, 2 species of western quail and mourning dove; mountain sheep, Columbian chipmunk, Mono chipmunk, gray-sided jack rabbit, black-tailed deer. *Observations* (in addition to specific records) : Olympic wapiti, Rocky Mountain black-tailed deer, mule deer, alpine chipmunk. The deciduous forms are generally palatable to livestock but the evergreen forms are usually worthless.

Ceanothus americanus L. **Jersey-tea.**

Range: 17, 20, 22, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule, available September–November.

A small, bushy shrub; flowers May–July; root system very large, taproot very well developed, deep penetrating in sandstone, limestone, sand, clay, and other soils.

Stomach records: Four species of birds including bobwhite and wild turkey.

Ceanothus arboreus Greene. **Island myrtle.**

Range: 5.
Site: Dry, well-drained, sun.
Fruit: Capsule, available August–September.

A large shrub to small tree; flowers Ferbruary–March; crown open; foliage very ample; 90 percent germination of seeds may be obtained by treating with hot water at 194° F.; about 48,000 seeds per pound.

Ceanothus californicus, see *Ceanothus integerrimus.*

Ceanothus cordulatus Kellogg. **Mountain whitethorn.**

Range: 4, 5, 10.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule, available August–September.

A small, wide-spreading, intricately-branched, thorny shrub; flowers June–July; thicket forming; occurs from 6,000 to 9,000 feet; stump sprouts and reproduces by seed very well after fires; seeds treated with hot water to 176° F., then stratified 3½ months at 36° germinate up to 65 percent; seeds boiled 1 minute and stratified 3 months germinate up to 60 percent.

Observations: Mountain quail; of outstanding importance as browse for mule deer; mountain beaver. Considered inferior browse for cattle, but much used by sheep; fairly resistant to grazing.

Ceanothus crassifolius Torr. **Deer brush.**

C. insularis Eastw.
Range: 5.
Site: Dry, sun.
Fruit: Capsule.

A large, much-branched evergreen shrub; flowers January–April; occurs below 3,500 feet; foliage rather open; very inflammable; rarely coppices; intolerant of shade; propagation by seed heated to 70° C. in water, then cooled, and stratified 3 months at 35° F.; germination of 76 percent is thus obtained; about 33,000 seeds per pound.

Observations: Fair browse for mule deer.

Ceanothus cuneatus (Hook.) Nutt. **Wedgeleaf ceanothus.**

Range: 3, 4, 5.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small to large evergreen shrub; flowers March–May; occurs below 5,000 feet; spreading, rigid, intricately branched and with dense foliage; thicket forming; often sprawling; crown sprouts abundantly after fires; forms impenetrable thickets but seldom makes a continuous cover; regenerates from exposed roots; 92-percent germination of seeds is obtained when they are heated to 158° F. in water, allowed to cool, and stratified 3½ months at 36°; about 54,000 seeds per pound.

Stomach records: Valley quail. *Observations:* Mountain quail, mariposa brush rabbit; of outstanding importance for mule deer. If grazed extensively by stock, may cause kidney trouble in males; generally not browsed by stock.

Ceanothus cyaneus, see *Ceanothus tomentosus.*

Ceanothus dentatus Torr. and Gray. **Sand scrub.**

Range: 1, 5.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small, densely-branched shrub; flowers April–June; occurs on sandy and other soils; 83-percent germination of seeds may be obtained when they are treated with hot water to 158° F., cooled, and stratified 3 months at 36°. Several varieties occur within the range of the species, one of which, var. *impressus* Trel., is prostrate.

Ceanothus divaricatus, see *Ceanothus leucodermis* and *C. oliganthus.*

Ceanothus diversifolius Kellogg. **Trailing ceanothus.**

Range: 4.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule.

A small, trailing or prostrate, matlike shrub; flowers May–June; occurs from 300 to 600 feet elevation.

Observations: Fair browse for mule deer. Considered fair sheep browse.

Ceanothus fendleri Gray. **Fendler ceanothus.**

Range: 9, 11, 13, 14, 15.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule, available August–September.

A small to large shrub; branches spiny, sometimes procumbent; flowers June–August; may form dense thickets; occurs on sandy and other soils; root system somewhat shallow, taproot not deep; germination of seed not less than 16 percent.

Stomach records: Porcupine, black-tailed deer. *Observations:* A famous deer browse; heavily utilized by porcupines during summer. An important browse in the southwest for livestock.

Ceanothus ferrisae McMinn.

Range: 1, 3.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small to large evergreen shrub; branches stiff, divergent.

Ceanothus foliosus Parry. **Wavyleaf ceanothus.**

Range: 4.
Site: Dry, sun.
Fruit: Capsule, available April–May.

A small to large shrub; flowers April–May; occurs at 200 to 3,500 feet elevation; foliage dense; often procumbent or nearly prostrate; root nodules well developed; 92-percent germination of seeds may be obtained when they are treated in hot water at 158° F., cooled, and stratified 3 months at 36°.

Ceanothus greggii Gray. **Gregg ceanothus.**

C. verrucosus greggii (Brandeg.) Gray.
Range: 4, 9, 10, 11.
Site: Dry, sun.
Fruit: Capsule, available in July.

A small to large evergreen shrub; flowers March–May; spiny, rigid, and intricately branched. Considered by some to be *C. vestitus* Greene for California. Fair to good browse in winter and early spring for stock, especially goats.

Var. *perplexans* (Trel.) Jeps. (*C. perplexans* Trel.), occurs within the range of the species.

Ceanothus hirsutus, see *Ceanothus oliganthus.*

Ceanothus incanus Torr. and Gray. **Coast whitethorn.**

Range: 4.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large shrub; flowers April–May; forms extensive thickets; pioneers in logged woodland areas; stump sprouts after cutting; propagation is by seeds treated in hot water to 176° F., cooled, and stratified 3½ months at 36°; by this process 70-percent germination may be obtained.

Ceanothus infesta, see *Adolphia infesta.*

Ceanothus insularis, see *Ceanothus crassifolius.*

Ceanothus integerrimus Hook. and Arn. **Deer brush.**

C. californica Kellogg, *C. integerrimus puberulus* Abrams.

Range: 4, 11.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small to large, widely branched shrub; flowers June–August; occurs from 2,000 to 5,000 feet northward and from 4,000 to 6,500 feet southward; foliage dense; some leaves persist all winter; rapid growing; stump sprouts after cutting or fire; withstands grazing well; reproductive power good; easily shaded out by pine and fir; 85-percent germination of seed is obtained by heating to 176° F. in water, cooling, and stratifying 3½ months at 36°; 68-percent germination obtained with seeds boiled 1 minute and stratified 3 months.

Stomach records: Gambel quail. *Observations:* Of outstanding importance for mule deer; porcupine. The most important browse species for stock in California. Considered poisonous by some but probably of little significance physiologically. A valuable honey plant.

Ceanothus intermedius Pursh. **Redroot.**

C. americanus intermedius Koch.

Range: 28, 29, 30.
Site: Well-drained, sun.
Fruit: Capsule, available in September.

A small shrub; flowers April–May.

Ceanothus jepsonii Greene. **Jepson ceanothus.**

Range: 4.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small to large, rigid, erect shrub; flowers in April; colony forming; completely killed by chaparral fires.

Var. *purpurea* Jeps. (*C. purpurea* Jeps.), the hollyleaf ceanothus, occurs in the southern part of the range.

Ceanothus lemmonii Parry. **Plumas-brush.**

Range: 4.
Site: Well-drained, sun.
Fruit: Capsule.

A small, spreading shrub; flowers April–May.

Ceanothus leucodermis Greene. **Chaparral whitethorn.**

C. divaricatus of auth., not Nutt., *C. divaricatus grosse-serratus* Torr.

Range: 4, 5, 10.
Site: Dry, sun.
Fruit: Capsule.

A large shrub to small tree; spreading and spinose, flowers April–May; occurs from 1,000 to 5,000 feet; persists in spite of fire; 67-percent germination of seed obtained by heating in water to 158° F., cooling, stratifying at 36° for 3 months; 43-percent germination obtained by heating to 194°, cooling, and sowing for 4 months; about 77,000 seeds per pound.

Observations: Of outstanding importance as browse for mule deer. Value for livestock limited.

Ceanothus macrocarpus Nutt. **Big-pod ceanothus.**

C. megacarpus Nutt., *C. cuneatus macrocarpus* (Nutt.) Brandeg.

Range: 5.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A large shrub to small tree: flowers January–March; occurs at low altitudes.
Observations: California mule deer.

Ceanothus martinii Jones. **Martin ceanothus.**
C. sorediatus glabra Wats.
Range: 9, 13.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small to large shrub; flowers June–July. Highly palatable to sheep and cattle.

Ceanothus megacarpus, see *Ceanothus macrocarpus.*

Ceanothus microphyllus Michx.
Range: 29, 30.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small, spreading, much-branched evergreen shrub; flowers April–May; occurs in sandy and other soils.

Ceanothus oliganthus Nutt. **Hairy ceanothus.**
C. hirsutus Nutt., *C. divaricatus* Nutt., not of auth., *C. orcuttii* Parry.
Range: 5.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule.
A large shrub; flowers May–June; occurs below 3,500 feet.
Observations: California mule deer.

Ceanothus orcuttii, see *Ceanothus oliganthus.*

Ceanothus oregonus, see *Ceanothus sanguineus.*

Ceanothus ovalis, see *Ceanothus ovatus.*

Ceanothus ovatus Desf. **Redroot.**
C. ovalis Bigel.
Range: 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Capsule available September–November.
A small shrub; flowers May–June; occurs in sandy and other soils.
Stomach records: Bobwhite (?). One of the best stock browse species in the Black Hills.

Ceanothus palmeri Trel. **Cuyamaca bush.**
C. spinosus palmeri Jeps.
Range: 4, 5.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A large shrub; flowers May–June; occurs from 4,500 to 5,700 feet; stump sprouts after cutting. Browsed by cattle in times of scarcity of other feed.

Ceanothus papillosus Torr. and Gray. **Bennie bush.**
Range: 1, 5.
Site: Well-drained, sun.
Fruit: Capsule.
A small to rarely large shrub of open habit; flowers May–June; inflammable; 75-percent germination of seed is obtained by treating with hot water to 176° F., cooling, and stratifying 3½ months at 36°; about 200,000 seeds per pound.

Ceanothus parryi Trel. **Lady-bloom.**
Range: 4.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small to large shrub; flowers April–June; very openly branched.

Ceanothus parvifolius Trel. **Littleleaf ceanothus.**
Range: 4.
Site: Dry, sun.
Fruit: Capsule.
A small shrub; flowers in June; occurs from 4,700 to 6,500 feet.
Observations: Fair browse for mule deer.

Ceanothus perplexans, see *Ceanothus greggii.*

Ceanothus pinetorum Cov. **Kern ceanothus.**
Range: 4.
Site: Well-drained, sun.
Fruit: Capsule.

A small, spreading or erect shrub; flowers in June; occurs from 7,000 to 8,800 feet; procumbent or prostrate forms are known.

Observations: Rocky Mountain mule deer.

Ceanothus prostratus Benth. (pl. 6, *B*). **Mahala mat.**
Range: 4, 9, 12.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small, prostrate evergreen shrub; branches root where in contact with the soil, and form a matlike ground cover; forms are known that are not as prostrate as the species.

Var. *grandifolius* Jeps. occurs in region 1.

Observations: Fair browse for mule deer. Forage value for livestock slight or negligible.

Ceanothus pubescens (Torr. and Gray) Rydb.
C. ovatus pubescens Torr. and Gray.
Range: 15, 16, 18, 21, 22, 24, 25, 29, 30.
Site: Dry, sun.
Fruit: Capsule.

A small shrub; flowers May–July; occurs in sandy soils.

Ceanothus purpurea, see *Ceanothus jepsonii.*

Ceanothus rigidus Nutt. **Rigid ceanothus.**
C. verrucosus rigidus Brandeg.
Range: 1, 4.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small to large shrub; flowers February–April; rigidly and divaricately branched; occurs in sandy and other soils; closely related to *C. cuneatus* (q. v.), possibly only a blue-flowered variety; 92 percent germination of seed obtained by treating in hot water to 158° F., cooling, and sowing for 16 weeks.

Var. *fresnensis* Jeps. extends the range to region 3.

Observations: Fair browse for mule deer.

Ceanothus sanguineus Pursh. **Redstem ceanothus.**
C. oreganus Nutt.
Range: 1, 2, 4, 12, 24.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small to large shrub; flowers May–June.

Stomach records: Valley quail. Palatability to stock, fair to fairly good.

Ceanothus serpyllifolius Nutt.
Range: 30.
Site: Well-drained, sun.
Fruit: Capsule.

A small, diffusely-branched, decumbent, evergreen shrub; flowers April–May.

Ceanothus sorediatus Hook. and Arn. **Jim brush.**
Range: 4.
Site: Dry, sun.
Fruit: Capsule.

A large, thicket-forming, spiny shrub; flowers April–May; coppices vigorously after cutting or burning; produces little shade; occurs from 500 to 2,500 feet; practically 100-percent germination of seed can be obtained by boiling 5 minutes and stratifying 3 months at 36° F.

Ceanothus spinosus Nutt. **Greenbark ceanothus.**
Range: 5.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule.

Commonly a large shrub or rarely a small tree; partly evergreen, often wide spreading and straggling; sometimes spiny; colony forming; occurs below 2,000 feet; practically 100-percent germination of seed is obtained by heating in water to 158° F., cooling, and sowing for 16 weeks; about 48,000 seeds per pound.

Observations: Of fair importance as browse for mule deer.

Ceanothus subsericeus Rydb.
Range: 13.
Site: Dry, sun.
Fruit: Capsule.

A small shrub; flowers in July.

Ceanothus thyrsiflorus Esch. **Blueblossom.**
Range: 1.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule, available July–December.

A large shrub to small tree; evergreen; flowers April–June; nitrogen nodules very abundant; forms dense thickets after fires; a pioneer in cut-over areas, often to the exclusion of other species; not successful in heavy soils; root system shallow; 83-percent germination of seed obtained by treating in hot water to 158° F., cooling, and stratifying 3 months at 36°; about 182,000 seeds per pound.

Observations: An important food of Roosevelt elk.

Ceanothus tomentosus Parry. **Ione bush.**
Range: 4.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A large, loosely-branched shrub; flowers in May; occurs up to 3,000 feet; stump sprouts after cutting.

Var. *olivaceus* Jeps. (*C. cyaneus* Eastw.), Ramona bush, occurs in region 5.

Observations: Of slight importance as browse for mule deer.

Ceanothus velutinus Dougl. **Snowbrush.**
Range: 2, 4, 6, 7, 12, 13, 15.
Site: Dry, sun.
Fruit: Capsule.

A small to large evergreen shrub; flowers May–July; spreading and many stemmed from the base; possesses a single large taproot which may make transplanting difficult; root system spreading, deep; a pioneer, forming vast thickets in logged or burned-over areas; 68 percent germination of seed is obtained by treatment in hot water at 176° F., and stratification for 3 months at 36°, or 63 percent when boiled 5 minutes and stratified 3 months.

Stomach records: Plains white-tailed deer.

Observations: A fair browse for mule deer; pica. Usually grazed only slightly by stock; much grazing indicates poor range; attempts to eradicate the species by overgrazing by goats have failed.

Ceanothus verrucosus Nutt. **Barranca bush.**
Range: 5.
Site: Dry, sun.
Fruit: Capsule.

A small to large, wide-spreading shrub; flowers January–April; occurs in sandy soils, not successful in heavy soils; 20-percent germination of seed obtained when sown directly.

Ceanothus vestitus, see *Ceanothus greggii.*

Cebatha carolina, see *Cocculus carolinus.*

Cebatha diversifolia, see *Cocculus diversifolius.*

Celastrus scandens L. **Climbing bittersweet.**
Range: 11, 15, 16, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Pod, seeds with pulpy arils, available September–December, rarely later.

A twining, high-climbing, or thicket-forming vine; essentially dioecious but pistillate plants have enough staminate flowers to ensure fertilization; injures trees by constriction; very common along fence rows; occurs in loam, sand, clay, and other soils; propagation is by seeds sown in fall or stratified and sown in spring, or by layers and root cutting; 12,000 seeds per pound, germination 80 percent, about 3,000 usable plants per pound of seed.

Stomach records: Eight species of birds, including ruffed grouse and bobwhite.

Observations: Seven species of birds, including ring-necked pheasant; cottontail rabbit, fox squirrel, songbirds. Not browsed by livestock; poisonous to horses but apparently not attractive to them.

Celosia palmeri Wats.
Range: 17.
Site: Well-drained, sun.
Fruit: Achenelike.

A small shrub.

Celtis spp. **Hackberries.**

Propagation of all species is by seeds sown as soon as ripe.

Stomach records (in addition to specific records): Twenty-four species of birds, including mallard.

Observations (in addition to specific records): Twenty species of birds; cliff squirrel, rock squirrel, snowshoe hare. Except for *C. douglasii,* western hackberries are without range significance for livestock.

Celtis aculeata, see *Celtis iguanaea.*

Celtis anfractuosa, see *Celtis iguanaea.*

Celtis canina, see *Celtis occidentalis.*

Celtis crassifolia, see *Celtis occidentalis.*

Celtis douglasii Planch. (pl. 6, A.).
C. rugosa Rydb.
Range: 5, 7, 8, 9, 11, 12, 13.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe, available July–January.

A small or large shrub to small tree; larger form found only on very good soil or in cultivation.

Stomach records: Two species of birds. An important secondary browse for cattle and sheep, especially in early spring and winter; galls on the leaves, a general condition in Utah, reduces palatability to livestock.

Celtis georgiana Small. **Georgia hackberry.**
C. pumila georgiana (Small) Sarg.
Range: 25, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe.

A small shrub to small tree.

Celtis helleri, see *Celtis lindheimeri.*

Celtis iguanaea (Jacq.) Sarg.
C. platycaulis Greenm., *C. anfractuosa* Liebm., *C. aculeata* Sw., *Momisia aculeata* Kl.
Range: 17, 32.
Site: Well-drained, sun.
Fruit: Drupe.

A large shrub to small tree with spiny branches; somewhat climbing; commonly occurs on sandy soil.

Celtis laevigata, see *Celtis mississippiensis.*

Celtis lindheimeri Koch. **Paloblanco.**
C. helleri Small.
Range: 17, 20.
Site: Well-drained, sun.
Fruit: Drupe; available in September, persistent until spring.

A small to large tree.

Celtis mississippiensis Bosc. **Southern hackberry.**
C. laevigata Willd., *C. smallii* Beadle.
Range: 11, 16, 17, 20, 22, 25, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe; available September–October, more or less persistent.

A large shrub to small or large tree; wood used to some extent commercially; 2,500–4,000 seeds per pound.

Var. *anomala* Sarg. is a shrub occurring in region 20, commonly in sand.

Stomach records: Ten species of birds. *Observations:* Wild turkey; eaten as a last resort by marsh rabbits.

Celtis occidentalis L. Hackberry.

Range: 15, 16, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.

Site: Dry, well-drained, moist, sun, shade.

Fruit: Drupe; available September–October, often persistent until June.

A large shrub to more commonly a small or large tree; much spread by introduction as a drought-resistant plant; root system medium deep to shallow; rapid growing; short-lived; in general free from serious insect enemies and diseases, except for a witches'-broom caused by the mite *Eriophyes* and a powdery mildew fungus; the witches'-broom does not cause serious damage to the tree; very resistant to drought; wood somewhat used commercially; propagated by layering, cuttings, and seed; easily transplanted when young; 1,500–2,000 seeds per pound, germination 86 percent, about 500 usable plants per pound of seed; seeds treated with concentrated sulphuric acid 1 hour, washed in water, and treated an additional hour in concentrated sulphuric acid, give 84-percent germination in 55 days, as against 22 percent in 65 days after stratification at 41° F. for 2 months; fruit produced sparingly. Very variable in size, form, and color of fruit.

Several varieties have been described, such as var. *canina* Sarg. (*C. canina* Raf.), a tree occurring with the species, var. *crassifolia* (La Marck) Gray, (*C. crassifolia* Lam.) and var. *pumila* Muhl., a low, straggling shrub.

Stomach records: Twenty-five species of birds, including bobwhite and lesser prairie chicken. *Observations:* Twenty species of birds, including wild turkey, ring-necked pheasant, and prairie sharp-tailed grouse.

Celtis pallida Torr. (pl. 7, A). Desert hackberry.

Momisia pallida (Torr.) Planch.

Range: 10, 11, 16, 17, 20.

Site: Dry, sun.

Fruit: Drupe, available July–November.

A large, spiny, densely-branched, evergreen shrub; forms dense thickets; wood useful for fence posts; seed germination apparently low.

Stomach records: Six species of birds, including Gambel and scaled quail; antelope jack rabbit. *Observations:* Scaled quail, mocking bird, thrasher, phainopeplas, cactus wren, cardinal, pyrrholoxia, towhee, Gambel quail; used almost to the exclusion of other species as roosts by Gambel quail; Mexican raccoon, jack rabbit, captive deer. A good honey plant.

Celtis platycaulis, see *Celtis iguanaea.*

Celtis reticulata Torr. Thick-leaved hackberry.

C. mississippiensis reticulata Sarg.

Range: 5, 9, 10, 11, 14, 16, 17, 19, 20.

Site: Dry, well-drained, moist, sun.

Fruit: Drupe, available in September.

A large shrub to small or large tree; grows in limestone and other soils including rocky and gravelly ones; wood locally used for fence posts; berries rich in calcium; formerly a staple Indian food; seed germination about 80 percent, about 400 usable plants per pound of seed.

Var. *vestita* Sarg. (*C. rugulosa* Rydb.) occurs in the northeastern portions of the range.

Celtis rugulosa, see *C. reticulata.*

Celtis rugosa, see *Celtis douglasii.*

Celtis smallii, see *Celtis mississippiensis.*

Cephalanthus occidentalis L. Buttonball bush.

Range: 3, 4, 5, 11, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.

Site: Well-drained, moist, sun, shade.

Fruit: Nutlike capsule, available September–December or even later.

Commonly a large shrub, rarely a small or even a large tree; flowers in May northward, August southward; generally occurs in neutral soil; will grow in fresh soil under cultivation but in the wild state usually dies out for lack of moisture; propagation is by seed sown in fall or stratified and sown in spring, probably also by cuttings.

Stomach records: Twenty-five species of birds, most of them water or shore birds; composed 1.76 percent of food of 1,725 mallards. *Observations:* Ring-necked pheasant. Probably poisonous to livestock if eaten. A good bee plant.

Cerasus borealis, see *Prunus nigra.*

Cerasus caroliniana, see *Prunus caroliniana.*

Cerasus demissa, see *Prunus demissa.*

Cerasus emarginata, see *Prunus emarginata.*

Cerasus mahaleb, see *Prunus mahaleb.*

Cerasus minutiflora, see *Prunus minutiflora.*

Cerasus nigra, see *Prunus nigra.*

Cerasus trichopetala, see *Prunus corymbulosa.*

Ceratiola ericoides Michx. **Rosemary.**
Range: 29, 30, 31.
Site: Dry, well-drained, sun.
Fruit: Drupe.

A small, much-branched, aromatic evergreen shrub; often occurs in very acid soil; easily destroyed by fire.

Stomach records: Lesser scaup.

Cercidiopsis microphylla, see *Cercidium microphyllum.*

Cercidium spp.

All species are propagated by seed.

Stomach records (in addition to specific records): Mountain sheep.

Cercidium floridum, see *Cercidium macrum*, and *C. torreyanum.*

Cercidium macrum Johnst. **Texas paloverde.**
C. floridum of auth.
Range: 11, 17.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small tree; thorny but not as much so as *C. texanum;* flowers throughout the summer.

Cercidium microphyllum (Torr.) Rose and Johnst. **Littleleaf horsebean.**
Parkinsonia microphylla Torr., *Cercidiopsis microphylla* (Torr.) Britt. and Rose.
Range: 10, 11.
Site: Dry, sun.
Fruit: Legume, persistent for at least a year after ripening.

A small to large shrub or rarely small tree; spiny; somewhat used locally for food.

Observations: Jack rabbit. Of local importance as an emergency forage for livestock.

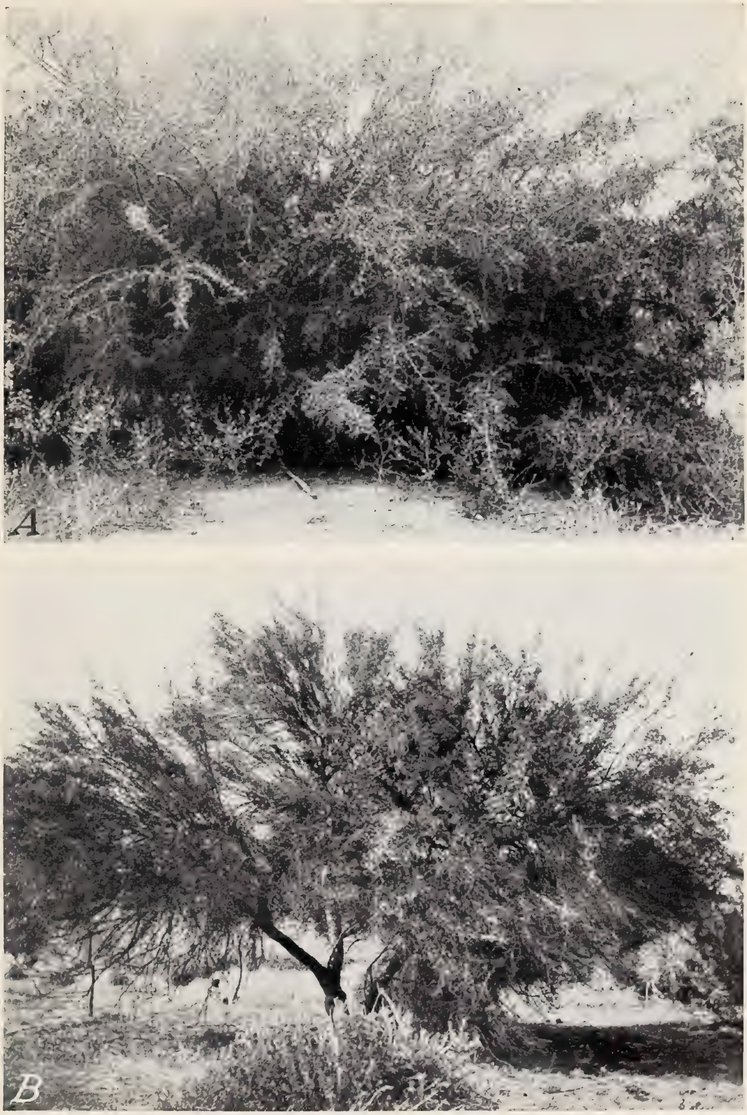
Cercidium texanum (Wats.) Gray.
Parkinsonia texana Wats.
Range: 11, 17.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small or rarely a large shrub; thorny and often intricately branched; leaves early deciduous; often forms dense thickets; easily grown from seed; said to be a honey plant.

Cercidium torreyanum (Wats.) Sarg. (pl. 7, *B*). **Paloverde.**
C. floridum Torr. not Benth., *Parkinsonia torreyana* Wats.
Range: 10, 11.
Site: Dry, sun.
Fruit: Legume; available July, falls immediately.

A small to large tree; flowers April–May; occurs in sandy and other soils; leafless most of the year.

Stomach records: Gambel quail. *Observations:* A favorite food of burro deer. Of local importance as an emergency forage for livestock. A good bee plant.



A, Celtis pallida, the desert hackberry, because of its great importance for wildlife and the dense cover it produces, should prove of outstanding value in planting for soil and wildlife conservation. *B, Cercidium torreyanum.* The recorded value of the paloverde as food for wildlife is not great, but as cover for soil and wildlife in arid regions its value is obvious. (Photograph by U. S. Forest Service.)

A, *Cercis canadensis.* The pods of the redbud often remain unopened throughout the winter, except those opened by birds. *B*, *Chionanthus virginica.* The beauty and fragrance of the flowers of the fringe tree entitle it to a place in highway plantings.

Cercis canadensis L. (pl. 8, *A*). **Redbud.**
Range: 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Legume; available July–August, pods persist throughout winter, seeds fall or not.

A small tree; flowers March–April; occurs in slightly acid, sand, loam, calcareous, and other soils; root nodules are not formed by this legume; propagation is by seed treated with hot water and sown in spring; about 25,000 seeds per pound; seed germination 80 percent, about 2,000 usable plants per pound of seed.

Stomach records: Three species of birds, including bobwhite; white-tailed deer. *Observations:* Bobwhite; captive marsh rabbit.

Cercis occidentalis Torr. **Western redbud.**
Range: 3, 4, 5, 9, 11, 14, 16, 17.
Site: Dry, well-drained, moist, sun.
Fruit: Legume, available July–August.

A large shrub to small tree; flowers February–April; occurs in slightly acid soil; roots very long laterally; propagation is by seed treated with hot water and subsequently chilled for 3 months before sowing.

Observations: Rocky Mountain mule deer. Without forage value for livestock.

Cercis reniformis Engl. **Texas redbud.**
C. texensis Sarg.
Range: 17, 20.
Site: Dry, well-drained, sun.
Fruit: Legume.

Commonly a small to large shrub, more rarely a small to large tree; occurs on limestone or slightly acid soil; forms dense thickets; propagation is by seed treated with hot water and sown in spring.

Cercis texensis, see *Cercis reniformis.*

Cercocarpus spp. **Mountain-mahoganies.**
Stomach records (in addition to specific records): Black-tailed deer. *Observations* (in addition to specific records): A favorite food of Rocky Mountain mule deer and of Columbian black-tailed deer; yellow-haired porcupine. The species generally furnish much forage for cattle, sheep, and goats at all seasons.

Cercocarpus alnifolius Rydb. **Alderleaf mountain-mahogany.**
C. parvifolius Sarg., in part.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Achene, available July–September.

A large shrub or small tree; semievergreen; flowers in March; 33,000–60,000 seeds per pound.

Cercocarpus argenteus Rydb. **Silver mountain-mahogany.**
Range: 14, 16.
Site: Dry, sun.
Fruit: Achene, available in August.

A large evergreen shrub, flowers in May. An excellent browse for goats, relished also by cattle and sheep.

Cercocarpus arizonicus, see *Cercocarpus intricatus.*

Cercocarpus betuloides Nutt. **Birchleaf mountain-mahogany.**
C. parvifolius betuloides Sarg., *C. rotundifolius* Rydb., *C. douglasii* Rydb.
Range: 4, 5, 9, 11.
Site: Dry, sun.
Fruit: Achene, available July–September.

A large shrub to small or rarely large tree; evergreen; flowers April–June; exceedingly variable; crown sprouts with vigor after fire or with advance of old age; seed germinates well as soon as planted; in the mountain regions generally occurs below 6,000 feet.

Observations: Of fair importance as browse for mule deer. An important browse for cattle and sheep.

Site: Dry, sun.

Cercocarpus breviflorus Gray.
Range: 11, 14, 17.
Site: Dry, sun.
Fruit: Achene.

A large evergreen shrub.

Cercocarpus douglasii, see *Cercocarpus betuloides.*

Cercocarpus eximius, see *Cercocarpus paucidentatus.*

Cercocarpus flabellifolius, see *Cercocarpus montanus.*

Cercocarpus fothergilloides, see *Cercocarpus montanus.*

Cercocarpus hypoleucus Rydb.
Range: 12.
Site: Well-drained, sun.
Fruit: Achene.

A large shrub to small tree; evergreen; flowers June–July.

Cercocarpus intricatus Wats. **Littleleaf mountain-mahogany.**
C. intricatus villosus Schneid., *C. arizonicus* Jones.
Range: 9, 10.
Site: Dry, sun.
Fruit: Achene, available July–August.

A small evergreen shrub, flowers in May; densely branched, spinescent; generally occurs at elevations of 4,000–5,000 feet. A poor browse for livestock.

Cercocarpus ledifolius Nutt. **Curlleaf mountain-mahogany.**
Range: 4, 9, 10, 12, 13, 14.
Site: Dry, sun.
Fruit: Achene, available August–September.

A large shrub to small tree; evergreen; flowers July–August; occurs in gravelly and rocky soils.

Observations: Sonora deer; of outstanding importance as browse for mule deer. Very poor livestock forage.

Cercocarpus minutiflorus Abrams. **Small-flowered mountain-mohagony.**
Range: 5.
Site: Dry, sun.
Fruit: Achene.

A large evergreen shrub.

Cercocarpus montanus Raf. **Mountain-mahogany.**
C. fothergilloides H. B. K., *C. parvifolius* Nutt. *C. flabellifolius* Rydb.
Range: 9, 11, 12, 13, 14, 15, 16.
Site: Dry, well-drained, sun.
Fruit: Achene, available August–October.

A large shrub or rarely a small tree; evergreen; flowers May–July; root system deep, spreading; slow growing; casts little shade; 30,000–60,000 seeds per pound, germination not less than 22 percent.

Stomach records: Black-tailed deer, mountain sheep. *Observations:* Say chipmunk, Mexican bighorn, deer, and other herbivorous game animals. One of the most important western livestock browse species; palatability good for all livestock; reputed to be poisonous, but this appears to be doubtful; killed by overgrazing.

Cercocarpus parvifolius, see *Cercocarpus montanus*, and *C. alnifolius.*

Cercocarpus paucidentatus (Wats.) Britt. **Hairy mountain-mahogany.**
C. parvifolius paucidentatus Wats., *C. eximius* (Schneid.) Rydb.
Range: 11, 14.
Site: Dry, sun.
Fruit. Achene.

A large shrub to small tree; evergreen; flowers March–May and again in August. A first-class goat browse.

Cercocarpus rotundifolius, see *Cercocarpus betuloides.*

Cercocarpus traskiae Eastw. **Bigleaf mountain-mahogany.**
Range: 5.
Site: Dry, sun.
Fruit: Achene, available in August.

A large shrub to small tree; evergreen; flowers in May.

Cerothamnus carolinenses, see *Myrica carolinensis.*

Cerothamnus ceriferus, see *Myrica cerefera.*

Cerothamnus inodorus, see *Myrica inodora.*

Cerothamnus pumilus, see *Myrica pumila.*

Chamaebatia australis, see *Chamaebatia foliolosa.*

Chamaebatia foliolosa Benth. **Mountain misery.**
Range: 4.
Site: Well-drained, sun, shade.
Fruit: Achene.

A small, very leafy evergreen shrub; flowers in July; forms large mats by means of rootstocks; in cultivation. Worthless as livestock forage.

Var. *australis* Brandeg. (*C. australis* (Brandeg.) Abrams), which occurs in region 5, is somewhat taller than the species.

Chamaebatiaria glutinosa, see *Chamaebatiaria millefolium.*

Chamaebatiaria millefolium (Torr.) Maxim. **Fern-bush.**
C. glutinosa Rydb., *Spiraea millefolium* Torr., *S. glutinosa* (Rydb.) Fedde.
Range: 4, 9, 10, 12, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Pod.

A small to large, densely branched, aromatic shrub; flowers June–August.

Observations: Of slight importance as browse for mule deer. A fair browse for sheep and goats.

Chamaecyparis spp.

Monoecious, evergreen trees of importance in the production of timber. Six species are known, of which three occur in the United States; propagation is by seeds sown in spring.

Stomach records (in addition to specific records): three species of birds.

Chamaecyparis lawsoniana (Murr.) Parl. **Port Orford cedar.**
Range: 1, 2.
Site: Dry, well-drained, sun, shade.
Fruit: Cone, maturing in September–October of the second season, some opening, others holding seed until spring.

A large evergreen tree; moderately rapid growing; long-lived; resistant to fungi and insects, but not to fire; wood very durable, of importance commercially; seed crops heavy; vitality transient; about 70 varieties recognized in cultivation; seeds per pound variously stated from 80,000 to 234,000, germination about 40 percent, slow, about 129,000 usable plants per pound of seed.

Chamaecyparis nootkatensis (Lam.) Spach. **Alaska cedar.**
Range: 1, 4.
Site: Well-drained, sun.
Fruit: Cone; available September–October of the second season.

A large evergreen tree; slow growing, long-lived; root system shallow; little subject to fungus attack; wood of importance commercially, very durable; seeds produced sparingly, of transient vitality; 106,000 seeds per pound; some 15 varieties in cultivation.

Chamaecyparis thyoides (L.) BSP.
Range: 26, 27, 28, 29, 30, 31.
Site: Well-drained, moist, sun, shade.
Fruit: Cone; matures and opens September–October of the first season; persistent 2 to 3 years.

A large evergreen tree; root system shallow; easily damaged by fire; nearly free from insect attack; only slightly susceptible to fungi; not wind-firm; somewhat storm-damaged northward; generally occurs on sandy loam and other soils; wood of considerable importance commercially, very durable; large crops of seed produced annually from an age of 4 or 5 years; 420,000–470,000 seeds per pound; 3.64 pounds of seed per bushel of fruit; germination 70–90 percent; 12 varieties distinguished in cultivation.

Observations: Very little eaten by birds or rodents.

Chamaedaphne calyculata (L.) Moench. **Cassandra.**
Andromeda calyculata L., *Cassandra calyculata* Don.
Range: 21, 22, 23, 24, 26, 27, 28.
Site: Well-drained, moist, sun.
Fruit: Capsule, available August–September.

A small evergreen shrub; occurs only on acid peat; flowers April–June; forms dense thickets; propagation is by seeds sown under glass in winter or spring.
Observations: A staple winter food of prairie sharp-tailed grouse in Wisconsin; cottontail rabbit.

Chamaerops acaulis, see *Sabal minor.*

Chamaerops glabra, see *Sabal minor.*

Chamaerops hystrix, see *Rhapidophyllum hystrix.*

Chamaerops louisiana, see *Sabal louisiana.*

Chenopodium spinosum, see *Grayia spinosa.*

Chilopsis linearis (Cav.) Sweet. **Desertwillow.**
C. saligna Don, *Bignonia linearis* Cav.
Range: 5, 9, 10, 11, 16, 17, 20.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule, available September–October, persistent.
A large shrub to small or large tree; flowers May–June, showy; wood durable in contact with soil, of no commercial value; 50,000–100,000 seeds per pound, germination 40–60 percent, about 4,000 usable plants per pound of seed.
Stomach records: Gambel quail. Browsing of this species denotes overstocking or overgrazing of the range.

Chilopsis saligna, see *Chilopsis linearis.*

Chiogenes hispidula (L.) Torr. and Gray. **Creeping snowberry.**
Vaccinium hispidulum L.
Range: 12, 23, 24, 26, 27.
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available August–September.
A small prostrate evergreen vine; occurs in peat bogs and mossy woods; flowers May–June; roots at the nodes.
Stomach records: Ruffed grouse. *Observations:* Olive-backed thrush, spruce grouse.

Chionanthus virginica L. (pl. 8, *B*). **Fringetree.**
Range: 20, 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available September–October.
A large shrub to small or large tree; flowers May–June; occurs in sandy and other soils, often acid ones; loses foliage early; propagation is by seed stratified and sown in spring; about 2,000 seeds per pound; very ornamental in cultivation.
Stomach records: Pileated woodpecker.

Choisya dumosa (Torr.) Gray. **Starleaf.**
Astrophyllum dumosum Torr.
Range: 11, 17.
Site: Dry, sun.
Fruit: Follicle.
A small much-branched shrub. Ordinarily not browsed by livestock; reputed poisonous, but this apparently is questionable.

Chrysactinia mexicana Gray. **Damianita.**
Pectis taxifolia Greene.
Range: 11, 17.
Site: Dry, sun.
Fruit: Achene.
A small, much-branched, aromatic evergreen shrub; heathlike; flowers spring–summer. Not known to be grazed, but since it is medicinal with Mexicans and Indians may possibly have injurious properties.

Chrysobalanus oblongifolius Michx. **Deer-plum.**
Geobalanus oblongifolius (Michx.) Small.
Range: 29, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe, available in September.
A small shrub; flowers May–June; often forms thickets of considerable size by means of a dense network of underground stems; quickly recovers from burning; often occurs in sand.
Observations: Gophers, turtles, and other short-legged animals.

Chrysobotrya aurea, see *Ribes aureum.*

Chrysobotrya odorata, see *Ribes odoratum.*

Chrysocoma nauseosa, see *Chrysothamnus nauseosus.*

Chrysoma arborescens, see *Aplopappus arborescens.*

Chrysoma brachylepis, see *Aplopappus propinquus.*

Chrysoma laricifolius, see *Aplopappus laricifolius.*

Chrysoma nana, see *Aplopappus nanus.*

Chrysoma palmeri, see *Aplopappus palmeri.*

Chrysoma parishii, see *Aplopappus parishii.*

Chrysothamnus spp. (pl. 9, *A*). **Rabbitbrush.**

The members of this genus display great variation, and as many as 6 genera have been described and 88 forms, nearly all of which have been given specific rank at one time or another. Intergrading characters are many, and in this treatment we follow that of Hall and Clements (*247*).

The following records apply not only to woody species but to herbaceous ones, of which there are many:

Stomach records (in addition to specific records): Mountain sheep; black-tailed deer. *Observations* (in addition to specific records): A reserve food of western white-tailed jack rabbit; Oregon jack rabbit, mule deer, Arizona jack rabbit, western chipmunk, bighorn; generally of considerable importance as cover for plains birds and mammals. Palatability worthless to fairly good for livestock.

Chrysothamnus albidus (Jones) Greene.
Range: 8, 9.
Site: Dry, sun.
Fruit: Achene.

A small, brittle-twigged, very leafy shrub; a pronounced halophyte of alkali flats.

Chrysothamnus asper, see *Chrysothamnus parryi.*

Chrysothamnus baileyi, see *Chrysothamnus pulchellus.*

Chrysothamnus bigelovii, see *Chrysothamnus nauseosus.*

Chrysothamnus bloomeri, see *Aplopappus bloomeri.*

Chrysothamnus collinus, see *Chrysothamnus nauseosus.*

Chrysothamnus concolor, see *Chrysothamnus nauseosus.*

Chrysothamnus consimilis, see *Chrysothamnus nauseosus.*

Chrysothamnus corymbosus, see *Aplopappus cooperi.*

Chrysothamnus depressus Nutt. **Dwarf rabbitbrush.**
Bigelovia depressa Gray, *Linosyris depressa* Torr.
Range: 9, 10, 11.
Site: Dry, sun.
Fruit: Achene.

A small, densely clump-forming shrub. Closely cropped, apparently by sheep, but scarcely of importance as browse.

Chrysothamnus douglasii, see *Chrysothamnus viscidiflorus.*

Chrysothamnus elatior, see *Chrysothamnus pulchellus.*

Chrysothamnus elegans, see *Chrysothamnus viscidiflorus.*

Chrysothamnus filifolius, see *Chrysothamnus greenei.*

Chrysothamnus glareosus, see *Chrysothamnus nauseosus.*

Chrysothamnus glaucus, see *Chrysothamnus viscidiflorus.*

Chrysothamnus graveolens, see *Chrysothamnus nauseosus.*

Chrysothamnus greenei (Gray) Greene.
C. filifolius Rydb., *Bigelovia greenei* Gray.
Range: 9, 11.
Site: Dry, sun.
Fruit: Achene.

A small shrub; occurs on sandy, alkaline plains; flowers August–September; greatly increased by overgrazing. Of some slight value as browse for livestock where other feed is not available.

Chrysothamnus humilis, see *Chrysothamnus viscidiflorus.*

Chrysothamnus latifolius, see *Chrysothamnus viscidiflorus.*

Chrysothamnus leiospermus, see *Chrysothamnus nauseosus.*

Chrysothamnus linifolius, see *Chrysothamnus viscidiflorus.*

Chrysothamnus marianus, see *Chrysothamnus viscidiflorus.*

Chrysothamnus monocephalus, see *Chrysothamnus parryi.*

Chrysothamnus nauseosus (Pallas) Britt. **Rubber rabbitbrush.**
Chrysocoma nauseosa Pallas.
Range: 4, 6, 7, 8, 9, 11, 12, 13, 14, 15.
Site: Dry, sun.
Fruit: Achene.

A small to large shrub; flowers September–December; root system deep; reproduces readily from seed and grows vigorously when transplanted, even when crowns are divided; forms basal sprouts after cutting; contains on the average 2.8 percent of rubber, although this may increase to 6.5 percent in individual plants; the most constant producers are those forms inhabiting alkali soils; it has been estimated that 300 million pounds of good-grade rubber are represented in this country by this species, but extraction is not yet commercially profitable.

Twenty subspecies or varieties are included within this species; they represent the species in various sections of the Great Basin and adjacent areas. *C. nauseous* includes the following forms:

C. bigelovii (Gray) Greene, *C. collinus* Greene, *C. concolor* Rydb., *C. consimilis* Greene, *C. glareosus* Rydb., *C. graveolens* (Nutt.) Greene, *C. leiospermus* (Gray) Greene, *C. occidentalis* Greene, *C. oreophilus* Nels., *C. pinifolius* Greene, *C. pulcherrimus* Nels. (more robust), *C. salicifolius* Rydb., *C. speciosus* Nutt., *C. turbinatus* Rydb.

Certain forms, as *consimilis* and *viridulus*, form pure stands on alkali flats; in general the important varieties are subclimax dominants of the sagebrush association.

Observations: Northward it furnishes an important winter browse for elk and perhaps moose; California mule deer. Value as browse for livestock depends on local conditions; palatability ordinarily very low; probably poisonous when eaten exclusively; a not infrequent indicator of overgrazing.

Chrysothamnus newberryi, see *Chrysothamnus parryi.*

Chrysothamnus occidentalis, see *Chrysothamnus nauseosus.*

Chrysothamnus oreophilus, see *Chrysothamnus nauseosus.*

Chrysothamnus paniculatus (Gray) Hall. **Sticky rabbitbrush.**
Bigelovia paniculata Gray, *Ericameria paniculata* (Gray) Rydb.
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small to large, brittle-twigged shrub; flowers May–October; resistant to low temperatures; grows in extremely poor soils; rubber content about 2.5 percent, but strains may be found containing a higher percentage.

Chrysothamnus parryi (Gray) Greene.
Linosyris parryi Gray, *Bigelovia parryi* Gray.
Range: 4, 8, 9, 10, 11, 12, 13, 15.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small shrub occurring on sandy or gravelly soils; an indicator of overgrazing. Ten subspecies or varieties are recognized which do not separate on stable characters but which are more or less separated geographically; the whole complex is here considered a single major species. It includes among others: *C. asper* Greene, *C. newberryi* Rydb. *C. vulcanicus* Greene, *C. monocephalus* Nels. and Ken., and *C. wyomingensis* Nels.

Chrysothamnus pinifolius, see *Chrysothamnus nauseosus.*

Chrysothamnus pulchellus (Gray) Greene.
C. baileyi Woot. and Standl., *Bigelovia pulchella* Gray, *Linosyris pulchella* Gray.
Range: 9, 11, 16.
Site: Dry, sun.
Fruit: Achene.

A small shrub; usually occurs in sand.

Var. *elatior* (Standl.) Hall and Clem. (*C. elatior* Standl.) is taller than the species and occurs in region 11.

Chrysothamnus pulcherrimus, see *Chrysothamnus nauseosus.*

Chrysothamnus pumilus, see *Chrysothamnus viscidiflorus.*

Chrysothamnus salicifolius, see *Chrysothamnus nauseosus.*

Chrysothamnus serrulatus, see *Chrysothamnus viscidiflorus.*

Chrysothamnus speciosus, see *Chrysothamnus nauseosus.*

Chrysothamnus stenolepis, see *Chrysothamnus viscidiflorus.*

Chrysothamnus teretifolius (Dur. and Hilg.) Hall.
Linosyris teretifolia Dur. and Hilg., *Ericameria teretifolia* (Dur. and Hilg.) Jeps.
Range: 5, 8, 10.
Site: Dry, sun.
Fruit: Achene.

A small or rarely a large, brittle-twigged shrub; irregularly much branched and spreading to form a flat or rounded plant; rubber content 2.5 percent or 5 percent in certain strains. Resinous, and not browsed by livestock.

Chrysothamnus turbinatus, see *Chrysothamnus nauseosus.*

Chrysothamnus viscidiflorus (Hook.) Nutt. **Douglas rabbitbrush.**
Bigelovia douglasii Gray.
Range: 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15.
Site: Dry, sun.
Fruit: Achene.

A small or rarely a large shrub; about 20 segregates, 16 of which have been accorded specific rank, have been published; they pass insensibly into one another and cannot be easily or satisfactorily defined; the species as here treated includes:

C. douglasii Clem. and Clem., *C. elegans* Greene, *C. glaucus* Nels., *C. humilis* Greene, *C. latifolius* (Eaton) Rydb., *C. linifolius* Greene, *C. marianus* Rydb., *C. pumilus* Nutt., *C. serrulatus* Rydb., *C. stenolepis* Rydb.

This species also contains rubber, the highest content being found in forms inhabiting alkali soils.

All forms are browsed to a limited extent by sheep and cattle, except where other feed is fairly plentiful.

Chrysothamnus vulcanicus, see *Chrysothamnus parryi.*

Chrysothamnus wyomingensis, see *Chrysothamnus parryi.*

Cissus ampelopsis Pers. **Heartleaf ampelopsis.**
Ampelopsis cordata, Michx.
Range: 19, 20, 22, 25, 27, 28, 29, 30.
Site: Well-drained, moist, shade.
Fruit: Berry, available August–November.

A rapid-growing vine; flowers May–June; berry inedible; produces a great deal of cover; propagated by seeds sown after stratification; 9,600 seeds per pound.

Stomach records: Three species of birds, including bobwhite. *Observations:* A favorite fruit of brown thrasher, wood thrush, and flicker.

Cissus arborea (L.) Des Moul. (pl. 9, *B*). **Peppervine.**
C. stans Pers., *Ampelopsis arborea* (L.) Rusby.
Range: 17, 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available September–November.

A slender, bushy vine; ordinarily occurs in rich soil; flowers June–July; will grow under most difficult conditions; has been noted as common along roads and railroads in Alabama.

Cissus incisa (Nutt.) Des Moul. **Treebine.**
Vitis incisa Des Moul.
Range: 11, 16, 17, 20, 22, 25, 29, 30, 31.
Site: Dry, well-drained, sun.
Fruit: Berry, available in October.

A vigorous evergreen vine occurring in sandy and other soils; flowers June–August; easily transplanted; propagation is by seed or by division of the woody tubers.

Observations: Birds especially fond of the berries.

Cissus stans, see *Cissus arborea.*

Citharexylum brachyanthum Gray.
Range: 11, 17.
Site: Dry, sun.
Fruit: Drupe.

A small, much-branched, somewhat spinose evergreen shrub.

Citharexylum fruticosum L. **Fiddlewood.**
C. villosum Jacq.
Range: 17, 30, 31, 32.
Site: Dry, sun.
Fruit: Drupe.

A large shrub to small tree; evergreen; flowers all year round; ordinarily occurs in sandy soil.

Citharexylum villosum, see *Citharexylum fruticosum.*

Citrus trifoliata L. **Bitter orange.**
Poncirus trifoliata (L.) Raf.
Range: 17, 20, 29, 30.
Site: Well-drained, sun.
Fruit: Berry, available September–October.

A small, thorny, thicket-forming tree; flowers April–May; a native of China but naturalized in the regions indicated; used as grafting stock for oranges; much cultivated.

Cladothamnus campanulatus, see *Rhododendron albiflorum.*

Cladrastis lutea (Michx.) Koch. **Yellow-wood.**
Range: 25, 27, 29.
Site: Dry, well-drained, sun.
Fruit: Legume, available September–October, persistent through winter or soon falling.

A small to large tree; flowers May–June; ordinarily occurs on rich, calcareous or neutral soil; propagated by seeds sown in spring; very handsome in flower and much cultivated.

Clematis spp.

The species are propagated by seeds sown under glass in spring.

Stomach records (in addition to specific records): Black-tailed deer. *Observations* (in addition to specific records): Goldfinch.

Clematis addisonii Britt. **Smooth clematis.**
Viorna addisonii (Britt.) Small.
Range: 27, 28.
Site: Well-drained, sun.
Fruit: Achene.

A shrubby vine; flowers in May; root system deep; stems weak.

Clematis arizonica Heller.
Viorna arizonica Heller.
Range: 11.
Site: Dry, sun.
Fruit: Achene.

A vine.

Clematis bigelovii Torr.
Viorna bigelovii (Torr.) Heller.
Range: 14.
Site: Well-drained, sun.
Fruit: Achene.

A vine.

Clematis brevifolia, see *Clematis ligusticifolia.*

Clematis catesbyana Pursh. **Satin-curls.**
Range: 29, 30.
Site: Well-drained, sun, shade.
Fruit: Achene.
A vine; ordinarily occurs on sandy soil.

Clematis coccinea, see *Clematis texensis.*

Clematis columbiana (Nutt.) Torr.
Atragene columbiana Nutt.
Range: 2, 4, 12, 13.
Site: Well-drained, sun.
Fruit: Achene.
A vine, browsed to some extent by cattle in northwestern Montana when the foliage is young.

Clematis crispa L. **Curly clematis.**
C. cylindrica Sims, *Viorna crispa* (L.) Small.
Range: 17, 29, 30.
Site: Well-drained moist sun.
Fruit: Achene.
A slender vine; flowers June–September; often occurs on acid soil.

Clematis cylindrica, see *Clematis crispa.*

Clematis drummondii Torr. and Gray. **Drummond clematis.**
Range: 10, 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Achene, available in August.
A climbing or clambering vine.

Clematis filifera, see *Clematis pitcheri.*

Clematis flaccida, see *Clematis viorna.*

Clematis gattingeri Small.
Viorna gattingeri Small.
Range: 25.
Site: Well-drained, sun.
Fruit: Achene.
A slender vine, flowering in July.

Clematis glaucophylla, see *Clematis viorna.*

Clematis lasiantha Nutt. **Pipestem.**
Range: 3, 4, 5.
Site: Well-drained, moist, sun, shade.
Fruit: Achene.
A climbing or clambering vine; flowers April–May; about 103,000 seeds per pound.

Clematis ligusticifolia Nutt. **Virgins-bower.**
C. brevifolia Howell.
Range: 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 18, 19, 22.
Site: Well-drained, sun.
Fruit: Achene, available September–November.
A vigorous climbing or clambering vine; flowers June–August; root system shallow, fibrous; rootstocks produced; seed germination about 80 percent.
Stomach records: Black-tailed deer. *Observations:* Of slight importance as browse for mule deer.

Clematis missouriensis, see *Clematis virginiana.*

Clematis neo-mexicana Woot. and Standl. **New Mexico clematis.**
Range: 11.
Site: Dry, sun.
Fruit: Achene.
A vine.

Clematis obliqua (Small) Schneid.
Viorna obliqua Small.
Range: 29, 30.
Site: Well-drained, sun.
Fruit:' Achne.
A vine; flowers April–August.

Clematis palmeri Rose. **Palmer clematis.**
Viorna palmeri (Rose) Woot. and Standl.
Range: 14.
Site: Dry, well-drained, sun.
Fruit: Achene.
A vine.

Clematis pauciflora Nutt. **Rope-vine.**
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Achene.
A trailing, clambering, or climbing vine; flowers March–April.

Clematis pitcheri Torr. and Gray. **Red-flowered clematis.**
C. filifera Benth., *C. simsii* of auth., not Sweet, *Viorna pitcheri* (Torr. and Gray) Britt., *V. filifera* (Benth.) Woot. and Standl.
Range: 11, 16, 17, 20, 25, 30.
Site: Dry, well-drained, sun.
Fruit: Achene.
A high-climbing vine; flowers June–September.

Clematis pseudoalpina (Kuntze) Nels.
C. pseudoatragene pseudoalpina Kuntze, *C. alpina occidentalis* (Hornem.) Gray, *Atragene occidentalis* Hornem., *A. pseudoalpina* (Kuntze.) Rydb.
Range: 9, 12, 13, 14.
Site: Well-drained, sun.
Fruit: Achene.
A vine; flowers April–June; commonly occurs at high elevations.

Clematis reticulata Walt.
Viorna reticulata (Walt.) Small.
Range: 11, 20, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Achene.
A branching vine; flowers in July; occurs on sandy and other soils.

Clematis simsii, see *Clematis pitcheri.*

Clematis subreticulata Harb.
Viorna subreticulata Harb.
Range: 29, 30.
Site: Dry, well-drained, sun.
Fruit: Achene.
A vine; occurs on sandy and other soils.

Clematis texensis Buckl.
C. coccinea Engelm., *Viorna coccinea* (Engelm.) Small.
Range: 17, 20.
Site: Well-drained, sun.
Fruit: Achene.
A branching vine; flowers July–September.

Clematis versicolor Small.
Viorna versicolor Small.
Range: 25.
Site: Dry, well-drained, sun.
Fruit: Achene.
A vine.

Clematis verticillaris DC. **Mountain clematis.**
Atragene americana Sims.
Range: 23, 24, 26, 27, 28.
Site: Well-drained, moist, shade.
Fruit: Achene, available July–August.
A trailing or climbing vine; flowers May–June; often occurs on calcareous soil; a comparatively weak climber without great luxuriance.

Clematis viorna L. **Leather-flower.**
C. glaucophylla Small, *C. flaccida* Small, *Viorna viorna* (L.) Small.
Range: 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Achene.
A vine; flowers May–August; usually occurs in rich soil.

Clematis virginiana L. **Virginia clematis.**
Range: 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Achene, available August–September.

A climbing vine; flowers July–September.

Var. *missouriensis* (Rydb.) Palm. and Steyerm., (*C. missouriensis* Rydb.) occurs in regions 22, 24, and 25.

Clethra acuminata Michx. **White-alder.**
Range: 27.
Site: Well-drained, shade.
Fruit: Capsule.

A large shrub to small tree; ordinarily occurs on noncalcareous soil; flowers July–August; rarely attacked by insects or diseases; propagated by seeds sown under glass in winter or spring.

Clethra alnifolia L. **Sweet pepperbush.**
Range: 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.

A large shrub; flowers July–August; may occur in acid swamps or sandy woods; commonly persistent on sandy soil in the South; rarely attacked by insects or diseases; propagated like the preceding.

Clethra tomentosa Lam.
C. alnifolia tomentosa Michx.
Range: 29, 30.
Site: Moist, sun.
Fruit: Capsule.

A small to large shrub; flowers August–September, and occasionally in winter; propagated like the preceding.

Cliftonia monophylla (Lam.) Sarg. **Titi.**
Range: 29, 30.
Site: Moist, sun.
Fruit: A dry drupe, available August–September.

A large shrub to small or large tree; evergreen; flowers in April; stems often contorted. Browsed somewhat by livestock. A honey plant.

Clinopodium carolinianum, see *Clinopodium georgianum.*

Clinopodium coccineum (Nutt.) Kuntze.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Nutlet.

A small shrub; flowers all year, and ordinarily occurs in sand.

Clinopodium georgianum Harper.
C. carolinianum (Michx.) Heller.
Range: 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Nutlet.

A small shrub; flowers summer–fall.

Cneoridium dumosum (Nutt.) Hook. f.
Pitavia dumosa Nutt.
Range: 5.
Site: Dry, sun.
Fruit: Fleshy, drupelike capsule.

A small to large, much-branched evergreen shrub; flowers March–April.

Cocculus carolinus DC. **Carolina moonseed.**
Cebatha carolina Britt., *Epibaterium carolinum* (L) Britt.
Range: 11, 17, 20, 25, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe; available September–October, persistent over winter southward.

A climbing, bushy vine; semievergreen southward; commonly found along hedgerows and roadways.

Stomach records: Three species of birds.

Cocculus diversifolius DC. **Snailseed.**
Cebatha diversifolia (DC.) Kuntze.
Range: 11, 30.
Site: Well-drained, sun.
Fruit: Drupe.
A semievergreen, clambering vine very like the preceding.

Coldenia greggii, see *Ptilocalyx greggii.*

Coleogyne ramosissima Torr. **Blackbush.**
Range: 9, 10, 11.
Site: Dry, sun.
Fruit: Achene.
A small to large, much-branched, wide-spreading, spinescent shrub; flowers April–August; occurs on sandy, gravelly and other soils; thicket forming. Furnishes some feed for cattle and sheep in winter.

Coleosanthus atractyloides, see *Brickellia atractyloides.*

Coleosanthus cedrosensis, see *Brickellia microphylla.*

Coleosanthus desertorum, see *Brickellia desertorum.*

Coleosanthus frutescens, see *Brickellia frutescens.*

Coleosanthus laciniatus, see *Brickellia laciniata.*

Coleosanthus microphyllus, see *Brickellia microphylla.*

Coleosanthus multiflorus, see *Brickellia multiflora.*

Coleosanthus squamulosus, see *Brickellia squamulosa.*

Coleosanthus venulosus, see *Brickellia atractyloides.*

Colletia multiflora, see *Adolphia infesta.*

Colubrina californica, see *Colubrina texensis.*

Colubrina texensis (Torr. and Gray) Gray. **Hog-plum.**
C. californica Johnst., *Rhamnus texensis* Torr. and Gray.
Range: 10, 11, 20.
Site: Dry, sun.
Fruit: Drupelike capsule, available in June.
A large shrub to small tree; much branched; thicket forming; flowers April–May; adapted to a wide range of soil conditions; forage value unknown.

Comarostaphylos diversifolia, see *Arctostaphylos diversifolia.*

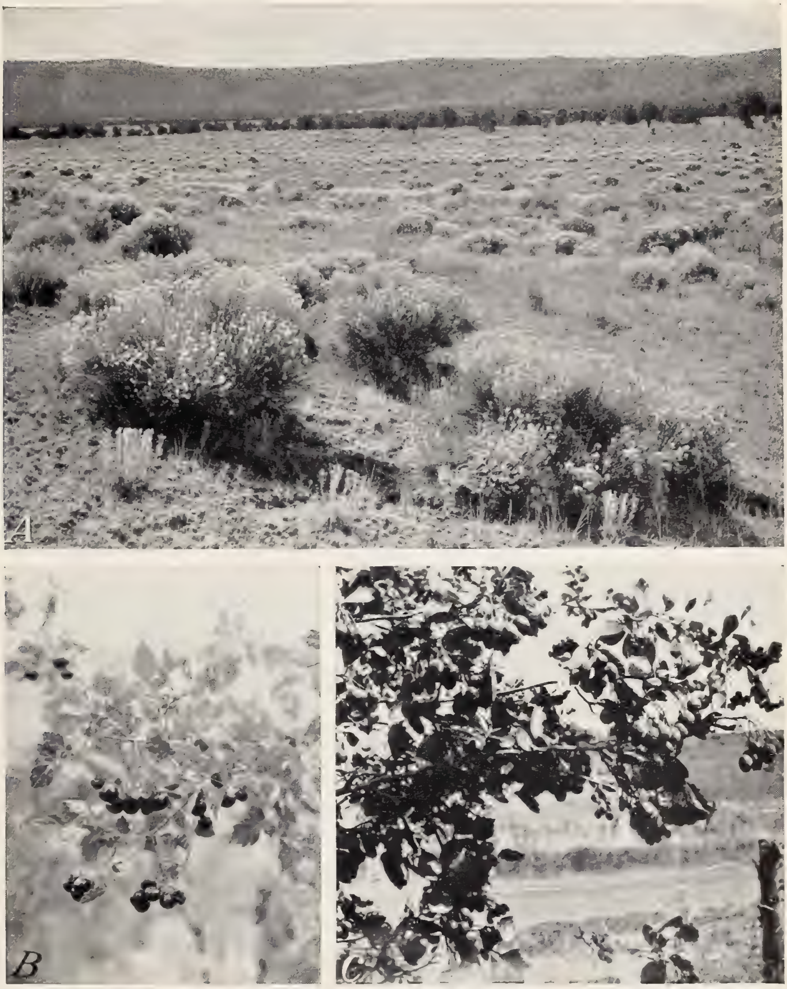
Comptonia peregrina, see *Myrica asplenifolia.*

Condalia spp.
Stomach records (in addition to specific records): Masked bobwhite, Gambel quail. *Observations* (in addition to specific records): Mexican raccoon, long-tailed Texas skunk, jack rabbit. Generally of low palatability to livestock.

Condalia lycioides (Gray) Weberb. **Lotebush.**
Zizyphus lycioides Gray.
Range: 9, 10, 11, 17.
Site: Dry, well-drained, sun.
Fruit: Drupe.
A small to large, straggling shrub; very rigid, spiny, most often without leaves; thicket forming; sometimes considered a range pest.
Observations: Taken by various birds, including Gambel and scaled quail, and band-tailed pigeon.

Condalia mexicana Schlecht. **Mexican bluewood.**
Range: 11, 17.
Site: Dry, well-drained, sun.
Fruit: Drupe.
A large shrub with spinose branches.

Condalia obovata Hook. **Bluewood.**
Range: 11, 16, 17, 20, 30.
Site: Dry, sun.
Fruit: Drupe, ripening irregularly through the summer.



A, *Chrysothamnus* spp. A view in Grand Canyon National Park showing the characteristic growth habit of rabbitbrush. The species are of importance as cover for plains wildlife and of value to livestock. (Photograph by Department of the Interior.) *B*, *Cissus arborea*. The beautiful pepper-vine's ability to grow in the poor soils along railroad embankments and roadsides suggests its use in controlling erosion on highway cuts. *C*, *Crataegus brevispina*. This important species for erosion control and wildlife plantings in the arid portions of the Northwest is distinctive in having blue-black fruit. The abundant crop, however, is characteristic of most hawthorns.

A, *Cornus amomum*. Streambank plantings of this species may provide excellent food and cover for wildlife frequenting stream edges. *B*, *C. paniculata*. The thicket-forming habit of this as well as many of the other shrub dogwoods or osiers recommends them for erosion control planting. Records show the fruits of this species to be particularly acceptable to birds.

A large shrub to small or large tree; flowers May–June; spiny; often leafless in the dry season; forms dense impenetrable thickets; wood valued as fuel.

Stomach records: Six species of birds. *Observations:* Much sought after by birds. Somewhat browsed by livestock.

Condalia obtusifolia (Hook.) Weberb. **Lotebush.**
Rhamnus obtusifolia Hook., *Zizyphus obtusifolia* (Hook.) Gray.
Range: 11, 16, 17, 20, 29, 30.
Site: Dry, sun.
Fruit: Drupe, available in June.

A small to large, spiny shrub; very persistent when established.

Stomach records: Phainopepla. *Observations:* Extensively eaten by gray fox.

Condalia parryi (Torr.) Weberb. **Parry jujube.**
Zizyphus parryi Torr.
Range: 10.
Site: Dry, sun.
Fruit: Drupe.

A large, spiny shrub; flowers in April.

Condalia spathulata Gray. **Squawbush.**
Range: 10, 11, 16, 17.
Site: Dry, sun.
Fruit: Drupe.

A large, more or less evergreen shrub; densely branched, rigid; occurs in sandy and other soils.

Stomach records: Gambel quail.

Conradina canescens (Torr. and Gray) Gray.
Range: 30.
Site: Well-drained, sun, shade.
Fruit: Nutlet.

A small, much-branched, stiff shrub; flowers May–July; occurs in sandy and other soils.

Cordia boissieri DC. **Anacahuita.**
Range: 11, 17.
Site: Dry, well-drained, sun.
Fruit: Drupe, available August–September.

A large shrub to small or rarely large tree; evergreen; flowers April–June; may occur on limestone soils; fruit edible but said to cause dizziness; very ornamental in cultivation.

Livestock are apparently fond of the fruit; seed eaten by hogs.

Corema conradii Torr. **Plymouth crowberry.**
Empetrum conradii Torr.
Range: 26, 27, 28.
Site: Well-drained, sun.
Fruit: Dry drupe, available July–August.

A small, evergreen shrub; flowers April–May; diffusely branched; usually dioecious; staminate plants very handsome in flower; occurs in sandy and other soils; forms large patches.

Coreopsis gigantea (Kellogg) Hall. **Giant coreopsis.**
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small robust, evergreen, single-stemmed shrub.

Corethrogyne cana, see *Aplopappus canus.*

Corethrogyne detonsa, see *Aplopappus canus.*

Cornus spp. **Cornels, dogwoods.**

The species are often difficult to separate, the characters used to distinguish them often being very minor; probably some species will eventually be reduced to synonyms; most species grow in neutral soil; propagation is by seed stratified at 32°–50° F. for 120 to 140 days and sown in spring. Seeds of many germinate the first year if planted promptly on ripening; many species more easily propagated by cuttings.

Stomach records (in addition to specific records): Sixty species of birds, including bobwhite and Richardson's grouse; gray fox, Virginia deer; composed

56.69 percent of food of eastern skunk in Michigan. *Observations* (in addition to specific records): Thirty-four species of birds, including bobwhite, ruffed and pinnated grouse; an important winter food of white-tailed deer; beaver; rabbit; skunk; eastern chipmunk.

Cornus alternifolia L. f. **Blue cornel.**
Svida alternifolia (L. f.) Small.
Range: 22, 23, 24, 25, 26, 27, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe, available July–September.

A small to large shrub or rarely a small to large tree; flowers May–July; subject to a serious twig blight.

Stomach records: Eleven species of birds, including ruffed grouse. *Observations:* Warbling vireo; white-tailed deer, cottontail rabbit.

Cornus amomum Mill. (Pl. 10, A) **Silky cornel.**
C. sericea L., *Svida amomum* (Mill.) Small.
Range: 15, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available August–September.

A small to large, spreading shrub; flowers May–July; grows on coal-stripped lands in Illinois.

Stomach records: Ten species of birds, including ruffed grouse and bobwhite. *Observations:* Ring-necked pheasant.

Cornus asperifolia Michx. **Roughleaf cornel.**
Svida asperifolia (Michx.) Small.
Range: 17, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe, available August–October.

Usually a large shrub or rarely a small to large tree; flowers May–June; often occurs on sandy soil; 16,600–21,000 seeds per pound.

Stomach records: Forty-one species of birds, including ruffed grouse, bobwhite, sharp-tailed grouse, and greater prairie chicken; composed 3.5 percent of fall food of prairie chicken in Wisconsin; armadillo. *Observations:* Wild turkey, ring-necked pheasant, cottontail rabbit.

Cornus baileyi Coult. and Evans. **Bailey cornel.**
Svida baileyi (Coult. and Evans) Rydb.
Range: 15, 18, 21, 23, 24, 26, 27.
Site: Moist, sun.
Fruit: Drupe, available July–October.

A small to large shrub; ordinarily occurs in sand; flowers May–June.

Stomach records: Bobwhite.

Cornus californica Mey. **Creek dogwood.**
Svida californica (Mey.) Abrams.
Range: 3, 4, 5.
Site: Well-drained, moist, sun.
Fruit: Drupe, available July–November.

A large shrub; flowers April–August; very closely related to *C. stolonifera* and perhaps more properly considered as a variety of that species.

Observations: Of outstanding importance as browse for mule deer in California.

Cornus candidissima, see *Cornus foemina.*

Cornus circinata L'Her. **Round-leaved cornel.**
C. rugosa Lam., *Svida rugosa* (Lam.) Rydb.
Range: 18, 21, 22, 23, 24, 25, 26, 27.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe, available July–October.

A large shrub; flowers May–July; occurs in sandy and other soils.

Stomach records: Ruffed grouse, sharp-tailed grouse. *Observations:* Blue-headed vireo; cottontail rabbit, moose.

Cornus florida L. **Flowering dogwood.**
Cynoxylon floridum (L.) Raf.
Range: 20, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe, available September-February.

A small to large tree; flowers April–June; root system not deep; slow growing, long-lived; relatively free from insects and diseases; coppices freely; often occurs in slightly acid soil; wood used commercially; difficult to transplant; propagation is by seed stratified 120 to 140 days at 32°–50° F. and sown in spring, or by cuttings which root best in peat after treatment with potassium permanganate; 3,500–4,000 seeds per pound, germination about 70 percent, about 1,000 usable plants per pound of seed.

Stomach records: Thirty-six species of birds, including ruffed grouse, bobwhite, and wild turkey; eastern chipmunk. *Observations:* Twenty-eight species of birds including bobwhite and wild turkey; ranks twenty-first on the list of quail food plants of the Southeast; preferred food of wild turkey; much eaten by squirrels; white-tailed deer; gray squirrel.

Cornus foemina Mill. **Stiff cornel.**
C. stricta Lam., *C. candidissima* Marsh., *Svida foemina* (Mill.) Rydb., *S. stricta* (Lam.) Small.
Range: 21, 22, 23, 24, 25, 27, 28, 29.
Site: Well-drained, moist, sun.
Fruit: Drupe, available September–October.

A large shrub; flowers May–June.

Cornus glabrata Benth. **Brown dogwood.**
Svida catalinensis Millsp.
Range: 1, 3, 4, 5.
Site: Moist, sun.
Fruit: Drupe, available August–September.

A large, thicket-forming shrub; flowers May–June; procumbent or drooping branches root where they touch the ground.

Cornus instolonea, see *Cornus stolonifera.*

Cornus interior Rydb.
Svida interior Rydb.
Range: 15, 16, 18, 19.
Site: Moist, sun.
Fruit: Drupe, available September–October.

A large shrub; flowers June–July.

Cornus microcarpa Nash.
Svida microcarpa (Nash) Small.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Drupe, available in September.

A large shrub; flowers April–May.

Cornus nuttallii Aud. **Pacific dogwood.**
Cynoxylon nuttallii (Aud.) Schaf.
Range: 1, 2, 3, 4, 5.
Site: Well-drained, sun, shade.
Fruit: Drupe, available October–November.

Usually a small tree, more rarely a large one; flowers in April and again in August–September; ordinarily grows best when somewhat shaded by adjacent trees, the removal of which often brings on the death of the plant; coppices freely; wood very little used commercially; cultivated to some extent; about 6,000 seeds per pound.

Stomach records: Four species of birds; Townsend's chipmunk. *Observations:* Cooper's chipmunk; of slight importance as browse for mule deer.

Cornus obliqua Raf. **Pale dogwood.**
C. purpusii Koehne.
Range: 21, 22, 23, 24, 25, 26.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available July–September.

A small to large, spreading shrub; flowers May–June; foliage dense; possibly better considered as a form of *C. amomum* (q. v.).

Cornus occidentalis Cov. **Western osier.**
C. pubescens Nutt., *Svida pubescens* (Nutt.) Standl.
Range: 1, 2, 3, 4, 7, 12, 13.
Site: Well-drained, moist, sun.
Fruit: Drupe, available July–October.

A large shrub to small tree; 14,000–17,500 seeds per pound.

Stomach records: Twelve species of birds. *Observations:* Mountain beaver. Occasionally grazed in the fall by cattle, less so by sheep and goats.

Cornus paniculata L'Her. (pl. 10, *B*). **Gray dogwood.**
C. racemosa of nurserymen.
Range: 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe; available August–November, occasionally persistent.

A small shrub; flowers in June; occurs on sandy, clay, gravelly and other soils; forms extremely dense thickets; successful on very difficult sites; endures city smoke; easily propagated by seeds, or particularly by cuttings; about 3,500 uncleaned seeds per pound.

Stomach records: Twenty-two species of birds, including ruffed grouse, bobwhite, sharp-tailed grouse and ring-necked pheasant; composed 0.4 percent of total annual food and 5.3 percent of fruit food of ring-necked pheasant in Michigan. *Observations:* An important pheasant food in southern Michigan as late in the season as May; cottontail rabbit.

Cornus priceae Small.
Svida priceae Small.
Range: 25.
Site: Dry, well-drained, sun.
Fruit: Drupe, available in September.

A small to large shrub; flowers April–May; very similar to *C. asperifolia* (q. v.).

Cornus pubescens, see *Cornus occidentalis.*

Cornus purpusii, see *Cornus obliqua.*

Cornus racemosa, see *Cornus paniculata.*

Cornus rugosa, see *Cornus circinata.*

Cornus sericea, see *Cornus amomum.*

Cornus sessilis Torr. **Miners dogwood.**
Range: 3, 4.
Site: Moist, sun.
Fruit: Drupe, available August–September.

A large shrub to small tree; flowers in April; thicket forming.

Cornus stolonifera Michx. **Red osier.**
Svida stolonifera (Michx.) Rydb.
Range: 4, 7, 8, 9, 11, 12, 13, 14, 15, 18, 21, 22, 23, 24, 25, 26, 27, 28.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe; available July–September, occasionally persistent until May.

A large, erect or spreading shrub; flowers May–July; thicket forming by means of rootstocks; occurs in sand or wet swamps; generally erect or spreading; prostrate branches root; tolerates alkaline soil; about 17,300 seeds per pound.

Var. *coloradensis* Schneid. (*C. instolonea* Nels.) is a variety without stolons.

Stomach records: Twelve species of birds including ruffed grouse, bobwhite, sharp-tailed grouse; plains white-tailed deer. *Observations:* Four species of birds including sharp-tailed grouse, Hungarian partridge; white-tailed deer, mule deer, elk, moose, cottontail rabbit snowshoe hare. Not at all or slightly browsed by livestock.

Cornus stricta, see *Cornus foemina.*

Corylus spp. **Hazelnuts.**

The species are ordinarily propagated by seeds stratified and sown in spring or sown directly in the fall; propagation by cuttings is often unsuccessful.

Stomach records (in addition to specific records): Four species of birds including ruffed grouse and sharp-tailed grouse; composed 1.0 percent of fall food of sharp-tailed grouse in Wisconsin. *Observations* (in addition to specific records): Seven species of birds including ring-necked pheasant; a staple winter food of greater prairie chicken, pinnated grouse, and ruffed grouse; white-tailed deer, moose, red squirrel, pale chipmunk, gray chipmunk, beaver, flying squirrels.

Corylus americana Walt. **American hazelnut.**
Range: 15, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun, shade.
Fruit. Nut, available July–September, occasionally persistent until December–February.

A large, thicket-forming shrub; coppices very freely after cutting; seldom bears fruit in the shade; easily transplanted; foliage generally dense; 250 seeds per pound, germination 80 percent, about 60 usable plants per pound of seed.

Stomach records: Ruffed grouse, bobwhite. *Observations:* Ring-necked pheasant; blue jay; squirrels, white-tailed deer. Somewhat grazed by sheep.

Corylus californica (DC.) Rose. **California hazelnut.**
C. rostrata californica DC.
Range: 1, 2, 3, 4.
Site: Well-drained, moist, sun, shade.
Fruit: Nut, available September–November.

A large shrub to small tree; thicket forming; foliage more or less dense.

Observations: Staple winter food of Steller's jay; Douglas' squirrel, Townsend's chipmunk, Allen's chipmunk, golden-mantled ground squirrel, digger squirrel; of slight importance as browse for mule deer. Extensively or not at all browsed by livestock.

Corylus cornuta, see *Corylus rostrata.*

Corylus rostrata Ait. **Beaked hazelnut.**
C. cornuta Marsh.
Range: 15, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Nut, available August-September.

A small to large, thicket-forming shrub, often occurs on acid soil.

Stomach records: Ruffed grouse, bobwhite; sharp-tailed grouse, prairie chicken; composed 2.7 percent of winter food of the northern sharp-tailed grouse in Quebec and Ontario. *Observation:* Blue jay; moose, southwestern chipmunk, eastern chipmunk, squirrels; eighth most important preferred winter food of white-tailed deer.

Corypha hystrix, see *Rhapidophyllum hystrix.*

Corypha minor, see *Sabal minor.*

Corypha palmetto, see *Sabal palmetto.*

Corypha pumila, see *Sabal minor.*

Corypha repens, see *Serenoa repens.*

Cotinus americanus Nutt. **Smoketree.**
C. cotinoides (Nutt.) Britt., *Rhus cotinoides* Nutt.
Range: 16, 17, 20, 25, 29.
Site: Dry, well-drained, sun.
Fruit: Drupe, available August–September.

A large shrub to small or large tree; flowers April–May; ordinarily occurs on calcareous soil; fruit produced very sparingly; wood very durable as fence posts; very brilliant scarlet in autumn.

Cotinus cotinoides, see *Cotinus americanus.*

Cotoneaster pyracantha (L.) Spach. **Firethorn.**
Pyracantha coccinea Roem., *Crataegus pyracantha* Medic.
Range: 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Pome; available October, persistent through winter.

A small to large evergreen shrub with dense foliage; flowers in May; very spiny; difficult to transplant except when small.

Observations: Robin; generally attractive to birds.

Coursetia axillaris Coult. and Rose.
Range: 17.
Site: Dry, sun.
Fruit: Legume.

A large shrub to small tree; densely branched.

Covillea glutinosa, see *Covillea tridentata.*

Covillea tridentata (DC.) Vail. **Creosotebush.**
C. glutinosa (Engelm.) Rydb., *Larrea mexicana* Moric., *L. glutinosa* Engelm., *L. tridentata* (DC.) Cov., *L. tridentata glutinosa* Jeps.
Range: 9, 10, 11, 16, 17.
Site: Dry, sun.
Fruit: Capsule.

A small to large evergreen shrub; slow growing; sparsely branched and with thin foliage, especially when older; inhabits the most xeric areas in North America; makes successful and persistent growth in thin bodies of soil over layers of hardpan; transplants ordinarily require considerable water to start them growing; very inflammable.

Stomach records: Gambel quail. *Observations:* Texas antelope squirrel, jack rabbit. Not eaten by livestock; poisonous to sheep.

Cowania alba, see *Cowania stansburiana.*

Cowania davidsonii, see *Cowania stansburiana.*

Cowania ericaefolia Torr. **Heath cliffrose.**
Range: 11, 17.
Site: Dry, sun.
Fruit: Achene.

A small, straggling, much-branched evergreen shrub found on limestone soils.

Cowania havardii Wats.
Range: 11.
Site: Dry, sun.
Fruit: Achene.

A small, much-branched evergreen shrub.

Cowania stansburiana Torr. **Quinine bush.**
C. mexicana dubia Brandeg., *C. davidsonii* Rydb., *C. mexicana stansburiana* (Torr.) Jeps., *C. alba* Good.
Range: 9, 10, 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Achene, available in October.

A small to large shrub or small to rarely large tree; evergreen; freely branched, stiff; flowers in June; increased branching occurs under grazing; seed germination 10–80 percent.

Stomach records: Black-tailed deer. *Observations:* A staple food of mule deer. An important and valuable browse for cattle and sheep. Browsing to 65 percent stimulates beneficially the reproduction of the plant; more than 80 percent causes deterioration.

Crataegus spp. **Hawthorns.**

These species are small shrubs to small trees growing in many sites, in all kinds of soil, in all parts of the country, most of them being almost impossible of identification except by specialists. No effort is here made to separate the various species. Somewhat more than 1,200 species have been listed for the country, the majority of these occurring in the northeastern United States; other studies have reduced this number to less than 100. Owing possibly to hybridization and great variation, the actual number of species has not been determined up to the present time. Nevertheless, these plants are of considerable value for erosion control and for wildlife food and cover. A great many of them are thicket forming and many species hold the fruit over the winter. Most species are thorny and provide a dense cover valuable for soil and wildlife alike. The best way in which to discover the utility of these species is to examine the wild forms occurring in any particular region and to collect such ones as seem to be able to grow on eroded sites and to produce the maximum amount of cover and food.

Most species grow in neutral soil, often on very poor soils; young plants often form long taproots and hence are often difficult to transplant; 6,000–40,000 seeds per pound, germination about 40 percent, about 2,500 usable plants per pound of seed; propagation is by seed stratified and sown in spring; alternate hosts for the cedar apple rust.

Special mention should be made of *Crataegus brevispina* (Dougl.) Heller, (*C. douglasii* Lindl.) (pl. 9, *C*) occurring in the northwest. This form makes dense thickets in more moist soils and produces its blue-black fruit in great abundance. Observers have noted that the ring-necked pheasant, Hungarian partridge and various western quails feed extensively on the berries. Two other western hawthorns, *C. columbiana* Howell, and *C. piperi* Britt, both red-fruited, occur in extremely dry situations and appear to be potentially of value in erosion control, more notably in the more arid sections of Oregon, Washington, and Idaho.

Stomach records (summary): Thirty-six species of birds, including bobwhite and eastern ruffed grouse; composed 9.63 percent of food eaten by ruffed grouse in the northeastern United States; gray fox, white-tailed deer. *Observations* (summary): Seventeen species of birds including Hungarian partridge, sharp-tailed grouse, ring-necked pheasant; white-tailed deer (in some localities, ignored in others), cottontail rabbit. Browsed somewhat by livestock. Considered valuable honey plants, especially where they occur in abundance.

Crataegus pyracantha, see *Cotoneaster pyracantha.*

Crookea microsepala (Torr. and Gray) Small.
Ascyrum microsepalum Torr. and Gray, *Hypericum microsepalum* (Torr. and Gray) Gray.
Range: 29, 30.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small evergreen shrub; often occurs in sandy soil.

Crossosoma bigelovii Wats.
Range: 10, 11.
Site: Dry, sun.
Fruit: Follicle.
A small, spreading, spinescent shrub; flowers in April.

Crossosoma californicum Nutt.
Range: 5.
Site: Dry, sun.
Fruit: Follicle.
A small to large shrub or small tree; flowers in May.

Crossosoma parviflorum Robins. and Fern.
Range: 9, 10, 11.
Site: Dry, well-drained, sun.
Fruit: Follicle.
A small to large shrub.

Crossostephium californicum, see *Artemisia californica.*

Crossostephium foliosum, see *Artemisia californica.*

Crossostephium insulare, see *Artemisia californica.*

Croton spp.
Stomach records (in addition to specific records, and including herbaceous as well as woody species): Thirty-six species of birds, including bobwhite, California quail, greater and lesser prairie chicken, and mourning dove.

Croton alabamensis Smith. **Alabama croton.**
Range: 29.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A large, much-branched thicket-forming evergreen shrub; flowers May–June; very rare.

Croton berlandieri, see *Croton humilis.*

Croton cortesianus H. B. K.
C. trichocarpus Torr.
Range: 17.
Site: Dry, sun.
Fruit: Capsule.
A large shrub.

Croton gonzalezii, see *Croton sonorae.*

Croton humilis L.
C. berlandieri Torr.
Range: 17, 32.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small shrub; occurs in sandy and other soils.

Croton pringlei, see *Croton sonorae.*

Croton sonorae Torr.
C. pringlei Wats., *C. gonzalezii* Greenm.
Range: 10.
Site: Dry, sun.
Fruit: Capsule.
A small to large, much-branched shrub.

Croton suaveolens Torr.
Range: 11, 16, 17.
Site: Dry, sun.
Fruit: Capsule.
A small, stout, much-branched shrub.

Croton trichocarpus, see *Croton cortesianus.*

Croton torreyanus Muell.
C. suaveolens oblongifolius Torr.
Range: 11, 17.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small, slender shrub.

Cupressus spp. **Cypress.**
Evergreen, monoecious trees of comparatively little value commercially. Seven species occur in North America, of which five are found in California and two in the southern Rocky Mountain region; propagation is by seed sown in spring.

Stomach records (in addition to specific records): Four species of birds.

Cupressus arizonica (Mast.) Greene. **Arizona cypress.**
Range: 11, 14.
Site: Dry, well-drained, sun.
Fruit: Cone, ripe in September of the second season, persistent many years.
A large evergreen tree; rapid growing in good soil, slow growing in poorer soils; long-lived; susceptible to fire; wood valuable locally, durable when seasoned; seeds remaining in unopened cones viable, at least for several years; germination percentage of seeds high, irregular; seed produced abundantly annually; 100,000 seeds per pound; much spread by cultivation.

Cupressus bakeri, see *Cupressus macnabiana.*

Cupressus forbesii, see *Cupressus guadaloupensis.*

Cupressus glabra Sudw. **Smooth cypress.**
Range: 11, 14.
Site: Well-drained, moist, sun, shade.
Fruit: Cone; ripening at the end of the second season, persistent unopened 14–18 years.
A large evergreen tree; slow growing, long-lived; wood of limited use commercially, moderately durable; seed germination moderately high, vitality of seed declining rapidly after fifth year.

Cupressus goveniana Gord. **Gowen cypress.**
C. pygmaea Sarg.
Range: 1.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Cone; mature in September of the second season; seeds shed September–October, cones persistent many years.
A large shrub to small or rarely large trees; evergreen; slow growing, long-lived; root system shallow; thrives on rocky or sandy soils; of no importance

commercially; seeds abundantly produced annually when plant is only 2 or 3 feet high; vitality of seeds persistent; ornamental in cultivation.

Cupressus guadaloupensis Wats. **Forbes' cypress.**
C. forbesii Jeps.
Range: 5.
Site: Well-drained, sun.
Fruit: Cone.
A small evergreen tree.

Cupressus macnabiana Murr. **Macnab cypress.**
C. nevadensis Abrams, *C. bakeri* Jeps.
Range: 1, 3, 4.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in autumn of the second season; seeds shed immediately, cones persistent several years.
A small to rarely large evergreen tree; slow growing, moderately long-lived; wood of no importance commercially; seeds produced annually; ornamental in cultivation.

Cupressus macrocarpa Gord. **Monterey cypress.**
Range: 5.
Site: Dry, well-drained, sun, shade.
Fruit: Cone; mature in August of the second season, opens slowly, persistent several seasons.
A large evergreen tree; at first rapid growing, later slower; long-lived; free from insects and most diseases; susceptible to fires because of its thin bark; forms a cover on wind-swept coasts to the water's edge; wood of little importance commercially; resistant to drought and mildly saline conditions; will withstand considerable abuse in handling; seeds produced annually in abundance; 93,000 seeds per pound, germination 16 percent; much spread by plantings; ornamental in cultivation.

Cupressus nevadensis, see *Cupressus macnabiana.*

Cupressus pygmaea, see *Cupressus goveniana.*

Cupressus sargentii Jeps. **Sargent cypress.**
Range: 1, 5.
Site: Well-drained, sun.
Fruit: Cone.
A small to large evergreen tree; seven varieties in cultivation.

Cyanococcus amoenus, see *Vaccinium corymbosum.*

Cyanococcus angustifolius, see *Vaccinium angustifolium.*

Cyanococcus atrococcus, see *Vaccinium atrococcum.*

Cyanococcus corymbosus, see *Vaccinium corymbosum.*

Cyanococcus elliottii, see *Vaccinium elliottii.*

Cyanococcus hirsutus, see *Vaccinium hirsutum.*

Cyanococcus myrsinites, see *Vaccinium myrsinites.*

Cyanococcus pallidus, see *Vaccinium corymbosum.*

Cyanococcus pennsylvanicus, see *Vaccinium angustifolium.*

Cyanococcus tenellus, see *Vaccinium virgatum.*

Cyanococcus vacillans, see *Vaccinium vacillans.*

Cyanococcus virgatus, see *Vaccinium virgatum.*

Cynoxylon floridum, see *Cornus florida.*

Cynoxylon nuttallii, see *Cornus nuttallii.*

Cyrilla racemiflora L. **Swamp ironwood.**
Range: 28, 29, 30.
Site: Moist, sun, shade.
Fruit: Corky drupe, available August–September.
A large shrub to small or large tree; semievergreen; much branched; flowers May–July; may occur on sandy or other soils; considered a good honey plant.

Cytisus scoparius (L.) Link. **Scotch broom.**
Range: 1, 2, 4, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Legume, available August–September.

A large evergreen shrub introduced from Europe but spreading in the regions indicated; flowers May–June; occurs most commonly on sand, but also on loam and clay; drought resistant; will grow on very poor soils; tolerant of saline conditions; will withstand considerable abuse in handling; claimed to be a weed in fields, especially sandy ones, but ordinarily regarded by farmers as not dangerous because it is easily burned off; has been used very successfully for erosion control on highway embankments along the Oregon coast; has been advocated as a renovater of barren soils because of the high potash content of its ash; considered by some authorities as in part parasitic on oak roots, but if so, is not an obligate parasite; 65,000 seeds per pound; propagated by seeds treated with hot water and sown in spring or by cuttings.

Stomach records: California quail. *Observations:* Captive bobwhite; cottontail rabbit. Poisonous to livestock, but seldom touched by grazing animals.

Dalea amoena, see *Parosela fremontii.*

Dalea arborescens, see *Parosela arborescens.*

Dalea argyrea, see *Parosela argyrea.*

Dalea californica, see *Parosela fremontii.*

Dalea emoryi, see *Parosela emoryi.*

Dalea formosa, see *Parosela formosa.*

Dalea fremontii, see *Parosela fremontii.*

Dalea frutescens, see *Parosela frutescens.*

Dalea greggii, see *Parosela greggii.*

Dalea humilis, see *Parosela thyrsiflora.*

Dalea johnsonii, see *Parosela fremontii.*

Dalea polyadenia, see *Parosela polyadenia.*

Dalea saundersii, see *Parosela fremontii.*

Dalea schottii, see *Parosela schottii.*

Dalea scoparia, see *Parosela scoparia.*

Dalea spinosa, see *Parosela spinosa.*

Dalea thyrsiflora, see *Parosela thyrsiflora.*

Dalea wheeleri, see *Parosela fremontii.*

Daphne mezereum L. **Mezereum.**
Range: 26, 27.
Site: Well-drained, sun, shade.
Fruit: Drupe, available August–September.

A small to large, sparse shrub; introduced from Europe and western Asia but locally established in the regions indicated; flowers March–April.

Observations: Eaten by songbirds.

Dasiphora fruticosa, see *Potentilla fruticosa.*

Datisca hirta, see *Rhus typhina.*

Daubentonia cavanillesii, see *Daubentonia drummondii.*

Daubentonia drummondii Rydb. **Poisonbean.**
D. cavanillesii Standl., *D. longifolia* of auth.
Range: 17, 20, 29, 30.
Site: Moist, sun.
Fruit: Legume.

A large shrub; often occurs in sand; seeds very poisonous to sheep and goats but pods and green plants apparently not harmful.

Daubentonia longifolia, see *Daubentonia drummondii.*

Daubentonia thurberi, see *Diphysa thurberi.*

Decachaena baccata, see *Gaylussacia baccata.*

Decachaena frondosa, see *Gaylussacia frondosa.*

Decachaena nana, see *Gaylussacia nana.*

Decachaena tomentosa, see *Gaylussacia tomentosa.*

Decachaena ursina, see *Gaylussacia ursina.*

Decumaria barbara L. **Climbing hydrangea.**
Range: 28, 29, 30.
Site: Moist, sun, shade.
Fruit: Capsule, available July.
A vine. Reputedly dermatitically poisonous.

Dendrium buxifolium, see *Leiophyllum buxifolium.*

Dendrium hugeri, see *Leiophyllum hugeri.*

Dendrium lyonii, see *Leiophyllum lyonii.*

Dendromecon rigida Benth. **Treepoppy.**
Range: 4, 5.
Site: Dry, sun.
Fruit: Capsule.
A small to large, rigid, freely-branched evergreen shrub; stems usually several from the base; common in burned-over territory.
Observations: California mule deer.

Desmothamnus lucidus, see *Xolisma lucida.*

Dicraurus leptocladus Hook. f.
Range: 17.
Site: Dry, sun.
Fruit: Achenelike.
A small dioecious shrub.

Diervilla diervilla, see *Diervilla lonicera.*

Diervilla lonicera Mill. **Bush-honeysuckle.**
D. diervilla (L.) MacBr., *D. trifida* Moench.
Range: 23, 24, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small shrub; flowers June–August; propagation is by seed sown under glass in spring.
Observations: An important summer food of moose on Isle Royale.

Diervilla rivularis Gatt.
Range: 27.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A small to large shrub; flowers July–August.

Diervilla sessilifolia Buckl.
Range: 27.
Site: Well-drained, sun.
Fruit: Capsule.
A small to large, loosely-branched shrub; flowers July–August.

Diervilla trifida, see *Diervilla lonicera.*

Diospyros texana Scheele. **Black persimmon.**
Brayodendron texanum Small.
Range: 11, 16, 17, 20, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available July–August.
A large shrub to small or large tree; dioecious; flowers April–May; wood used to some extent commercially; bears an abundance of fruit which supplies a black stain.
Observations: Wild turkey; Mexican raccoon, long-tailed Texas skunk; relished by many wild animals.

Diospyros virginiana L. (pl. 11). **Persimmon.**
Range: 20, 22, 25, 27, 28, 29, 30, 31.
Site: Dry, well-drained, moist, sun.
Fruit: Berry; available August–October, sometimes persistent.

A large shrub to small or large tree; flowers May–June; often forms dense thickets on dry, eroded slopes; stoloniferous; root system, including taproot, and stolons deep and wide spreading; trees produced from stolons usually do not reach large size; survives on extremely adverse sites; often difficult to eradicate from cultivated fields and pastures; fruits prolifically; various forms have been described varying in habit, fruit production, etc.; will grow in standing water for several months; forms have been observed which hold the fruit until March; fruits while still very young; occurs in sand, clay, loam, and other soils; occurs on coal-stripped lands in southern Illinois; wood used to some extent commercially; propagation is by seed stratified at 41°–50° F. for 365 days and sown in spring; 1,000 seeds per pound, germination about 80 percent.
Stomach records: Six species of birds,, including bobwhite; raccoon, spotted skunk, gray fox, red fox, white-tailed deer. *Observations:* Sixteen species of birds, including wild turkey; gray fox, red fox; much eaten by Virginia opossum; flying squirrel, spotted skunk; leaves refused by captive marsh rabbits; white-tailed deer. Not browsed by cattle; fruit greedily eaten by hogs.

Diphysa echinata, see *Diphysa thurberi.*

Diphysa thurberi (Gray) Rydb.
D. echinata Rose, *Daubentonia thurberi* Gray.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Legume.
A small to large shrub.

Diplacus arachnoides, see *Mimulus longiflorus.*

Diplacus aridus, see *Mimulus aridus.*

Diplacus aurantiacus, see *Mimulus aurantiacus.*

Diplacus longiflorus, see *Mimulus longiflorus.*

Diplacus parviflorus, see *Mimulus flemingii.*

Diplacus puniceus, see *Mimulus puniceus.*

Diplostephium canum, see *Aplopappus canus.*

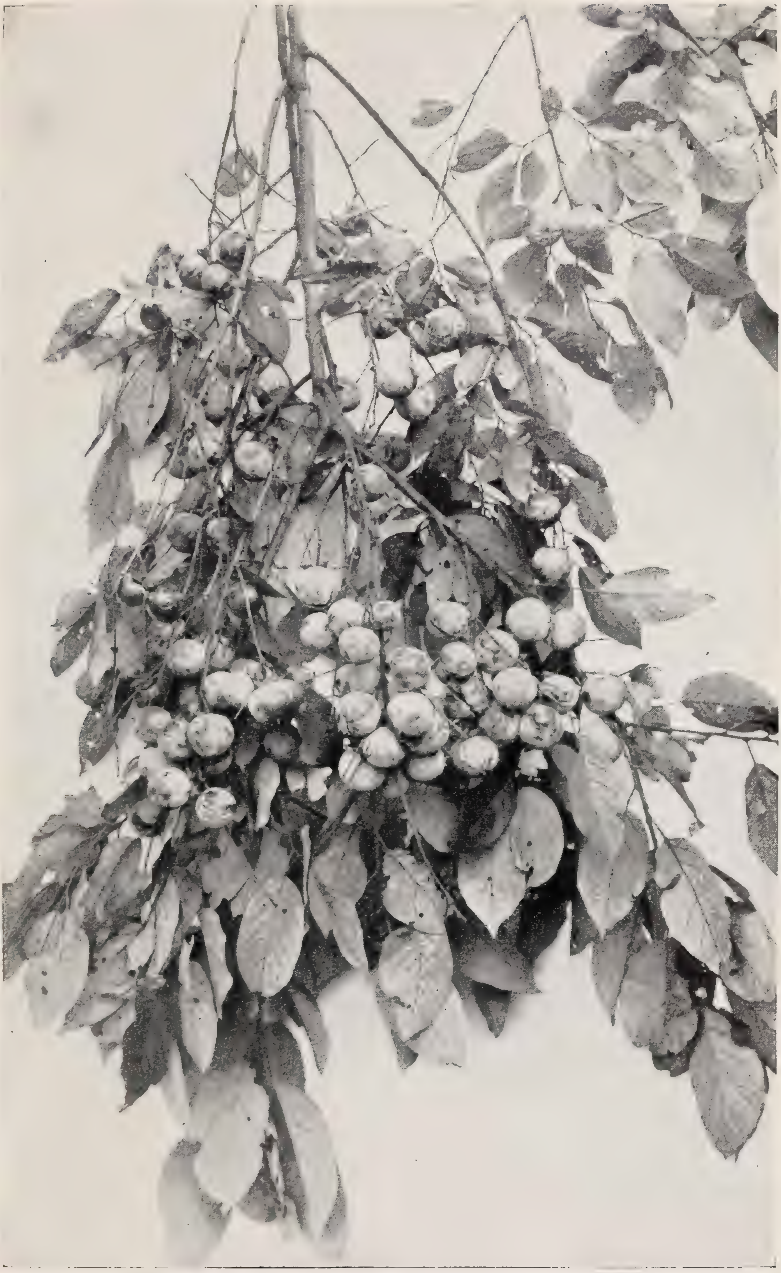
Dirca occidentalis Gray. **Western leatherwood.**
Range: 1.
Site: Dry, well-drained, sun.
Fruit: Drupe, available in June.
A small to large shrub; flowers February-March; colony forming; fruit rarely developed in any quantity; spreads by means of shoots developed from long roots; propagated by seed sown in fall or spring; difficult to transplant.

Dirca palustris L. **Leatherwood.**
Range: 22, 23, 24, 25, 27, 28, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe, available May–June, dropping at once or occasionally persistent.
A small to large shrub; widely branching when old; flowers March–April; free from insects and disease; ordinarily occurs in sterile soil of all kinds; propagation is by seed sown in fall or spring; berries said to be narcotic.
Observations: Moose; poorly eaten by white-tailed deer.

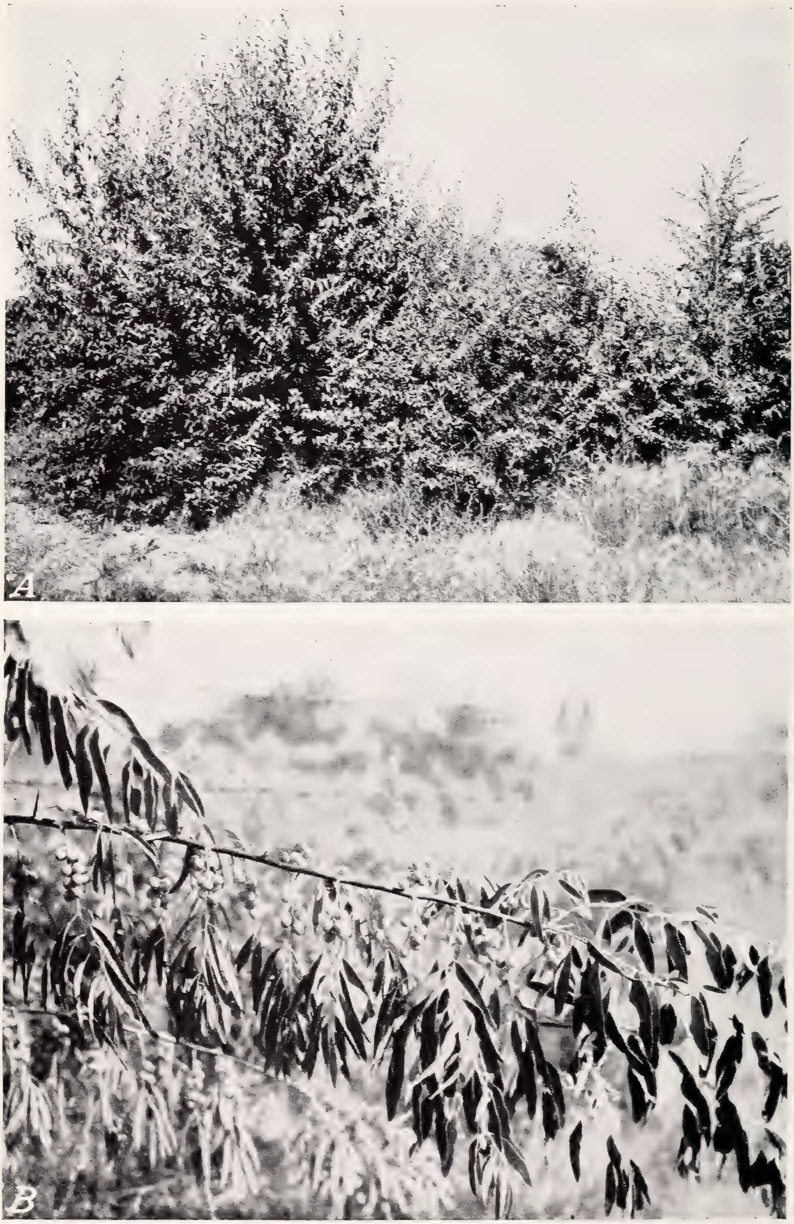
Distegia involucrata, see *Lonicera involucrata.*

Dodonaea arizonica Nels. **Hopbush.**
D. viscosa angustifolia (L. f.) Benth.
Range: 11.
Site: Dry, sun.
Fruit: Capsule.
A large shrub or rarely a small tree; often occurs on calcareous soils; produces seed abundantly; germination of seed at least 44 percent. Sometimes nibbled by stock but since it is a fish poison containing saponin it should be closely watched in time of scarcity of food for livestock.
Observations: Relished by Gambel quail and other birds.

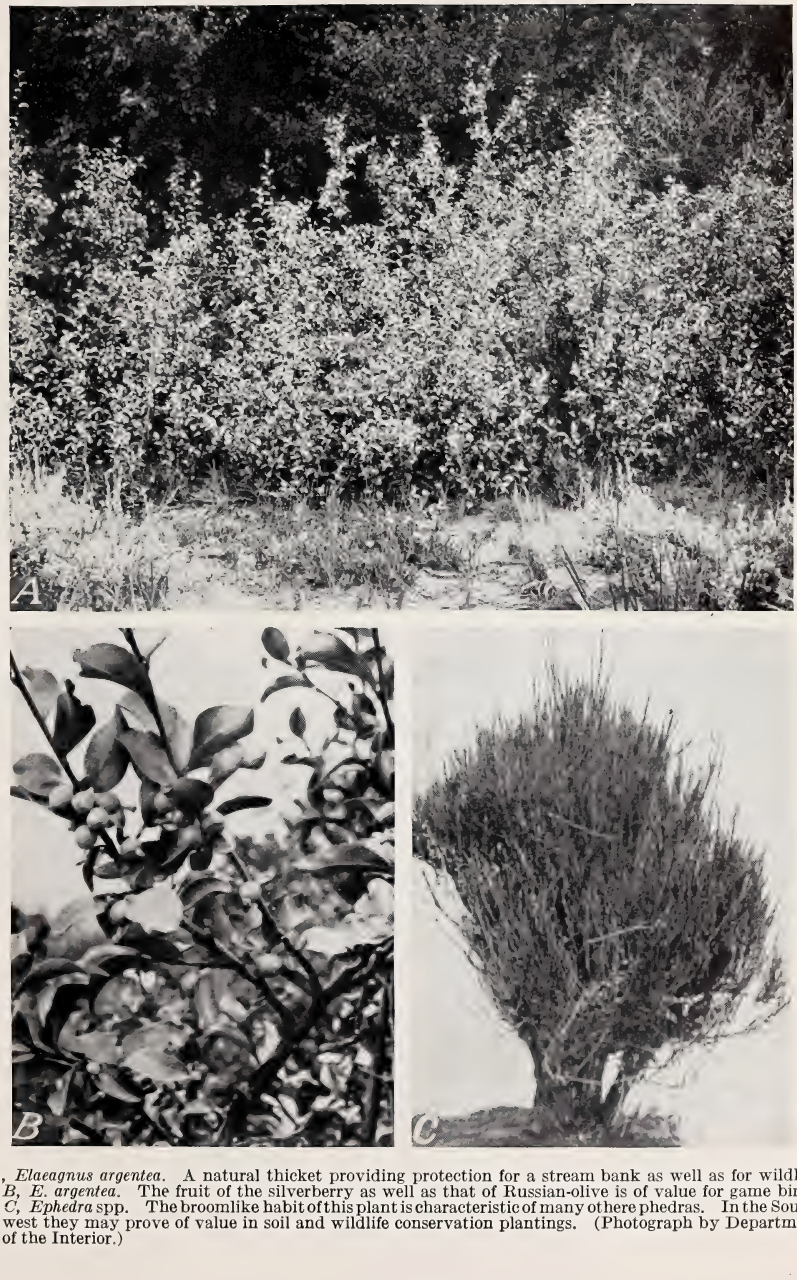
Drejera thurberi, see *Anisacanthus thurberi.*



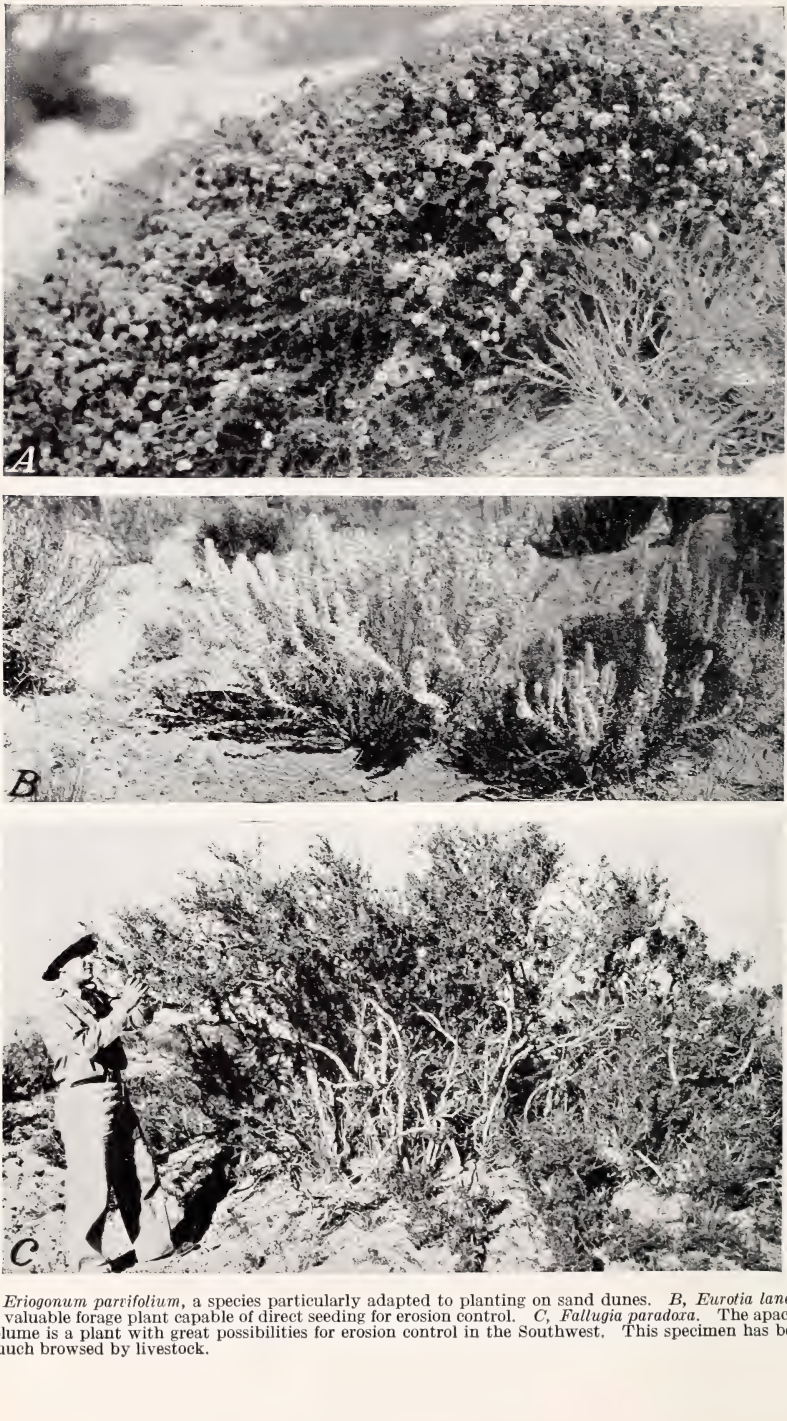
Diospyros virginiana, the ubiquitous persimmon, displays many characters of value in an erosion control program. Its fruits are of great importance to many forms of wildlife.



A, *Elaeagnus angustifolia.* A colony of escaped plants thriving on soil abandoned because of extreme alkalinity. Particularly while young, this species forms excellent soil cover. *B*, A branch showing the abundant fruit crop produced by the introduced Russian-olive. Reports indicate that native birds and mammals are taking the fruits with increasing frequency.



A, *Elaeagnus argentea*. A natural thicket providing protection for a stream bank as well as for wildlife. *B*, *E. argentea*. The fruit of the silverberry as well as that of Russian-olive is of value for game birds. *C*, *Ephedra* spp. The broomlike habit of this plant is characteristic of many other ephedras. In the Southwest they may prove of value in soil and wildlife conservation plantings. (Photograph by Department of the Interior.)



A, *Eriogonum parvifolium*, a species particularly adapted to planting on sand dunes. *B*, *Eurotia lanata*, a valuable forage plant capable of direct seeding for erosion control. *C*, *Fallugia paradoxa*. The apacheplume is a plant with great possibilities for erosion control in the Southwest. This specimen has been much browsed by livestock.

Drejera wrightii, see *Anisacanthus wrightii.*

Duranta plumieri, see *Duranta repens.*

Duranta repens L.
D. plumieri Jacq.
Range: 11, 17, 32.
Site: Well-drained, sun.
Fruit: Drupe.

A large shrub to small tree; spiny or unarmed; occurs in sandy and other soils

Earleocassia covesii, see *Cassia covesii.*

Ebenopsis flexicaulis, see *Pithecolobium flexicaule.*

Echinopanax horridum, see *Oplopanax horridum.*

Echites macrosiphon, see *Macrosiphonia macrosiphon.*

Edwinia americana, see *Jamesia americana.*

Edwinia californica, see *Jamesia americana.*

Ehretia anacua (Berl.) Johnst. **Anaqua.**
E. elliptica DC.
Range: 11, 17, 20, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe, available June–April.

Often a large shrub, occasionally a small or large tree; almost evergreen; flowers March–April; suckers freely from the roots and thus forms clumps; vigorous and difficult to eradicate when established; not subject to disease; grows well under semidesert conditions; usually shrubby on drier soils; suckers easily transplanted.

Observations: Attractive to birds.

Ehretia elliptica, see *Ehretia anacua.*

Elaeagnus spp.

Propagation of these species is by seed stratified and sown in spring or sown directly in the fall; most occur on neutral soil.

Stomach records (in addition to specific records): Sharp-tailed grouse. *Observations* (in addition to specific records): Pinnated and sharp-tailed grouse, songbirds.

Elaeagnus angustifolia L. (pl. 12, *A*, *B*). **Russian-olive.**
Range: 7, 9, 15, 18, 21, 22.
Site: Dry, well-drained, sun.
Fruit: Drupe; available August–October, often persistent until March.

A large shrub to small tree; introduced from Europe and western Asia and locally established in the regions indicated; tolerates considerable alkalinity or salinity; very resistant to drought; rarely attacked by insect pests; 1,000–4,000 seeds per pound; germination about 90 percent, about 500 usable plants per pound of seed.

Stomach records: Ring-necked pheasant. *Observations:* Eight species of birds, including sharp-tailed grouse, eaten by numerous birds in Europe; fox squirrel.

Elaeagnus argentea Pursh. (pl. 13, *A*, *B*). **Silverberry.**
E. commutata Bernh.
Range: 9, 15, 18, 21, 23, 24, 26.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe; available July–October.

A small to large, bushy shrub or small tree; flowers May–July; stoloniferous and thicket forming; will grow on limestone soil; 2,000 seeds per pound; germination about 90 percent, about 500 usable plants per pound of seed.

Observations: Ring-necked pheasant, prairie chicken; snowshoe hare. Fruit but not foliage taken by livestock.

Elaeagnus canadensis, see *Shepherdia canadensis.*

Elaeagnus commutata, see *Elaeagnus argentea.*

Elaeagnus rotundifolia, see *Shepherdia rotundifolia.*

Elaeagnus utilis, see *Shepherdia argentea.*

Elaphrium, see *Bursera.*

Elliottia racemosa Muhl.
Range: 29.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A large shrub; flowers June–July; commonly occurs on sandy soil; one of the rarest of American shrubs; spreads by rootstocks to form large colonies, which are known at only a few stations, many having been exterminated; self-pollination appears to be impossible and hence, because of the separation of clumps as they now exist, propagation by seed seems to have ceased; in cultivation.

Empetrum conradii, see *Corema conradii.*

Empetrum nigrum L. **Crowberry.**
Range: 1, 4, 24, 26, 27.
Site: Well-drained, moist, sun, shade.
Fruit: Berry; available August–September; often persistent the year round.

A small evergreen, procumbent shrub; monoecious or dioecious; forms dense colonies; occurs in sand or peat.

Stomach records: Forty-one species of birds, including ruffed grouse, Alaska spruce grouse, ptarmigan, and many water birds.

Emplectocladus andersonii, see *Prunus andersonii.*

Emplectocladus fasciculatus, see *Prunus fasciculata.*

Ephedra spp. (pl. 13, *C*).

Shrubby, usually dioecious gymnosperms with scalelike leaves; fruit conelike or nutlike, sometimes fleshy.

Stomach records (in addition to specific records): Mountain quail, Arizona cottontail, Holzner cottontail. *Observations* (in addition to specific records): Captive porcupine; much grazed by mule deer; Sacramento cottontail rabbit. Generally eaten by livestock.

Ephedra antisyphilitica Mey. **Canatilla.**
Range: 11, 16, 17, 19, 20.
Site: Dry, sun.
Fruit: Nutlike; available April–May.

A small to large shrub; branches lax, occasionally reclining or prostrate.

Ephedra californica Wats. **California jointfir.**
Range: 5, 10.
Site: Dry, sun.
Fruit: Nutlike.

A small, prostrate or ascending shrub.

Observations: Of slight importance as browse for mule deer.

Ephedra coryi Reed.
Range: 16.
Site: Dry, well-drained, sun.
Fruit: Berrylike; available spring–early summer.

A small, slender-stemmed, profusely-branched shrub; often occurs in sandy soils; produced from an underground stem whose origin is from a node of an extensive rhizome system; readily adjusts itself to shifting sands, seeds apparently not viable.

Ephedra fasciculata Nels.
Range: 10.
Site: Dry, sun.
Fruit: Nutlike.

A small evergreen shrub; stems slender, prostrate.

Ephedra funerea Cov. and Mort.
Range: 10.
Site: Dry, sun.
Fruit: Berrylike.

A small, much-branched, spinose shrub.

Ephedra nevadensis Wats. **Nevada jointfir.**
Range: 9, 10, 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Nutlike.

A small, nearly leafless, shrub with spreading branches. Much grazed by livestock.

Ephedra pedunculata Engelm.
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Berrylike, available September–November.

A shrub or small vine; stems often reclining or climbing over surrounding shrubs.

Ephedra texana Reed. **Texas jointfir.**
Range: 16.
Site: Dry, well-drained, sun.
Fruit: Berrylike.

A small to large shrub with erect branches; fruit comparatively fleshy.

Ephedra torreyana Wats. **Torrey jointfir.**
Range: 9, 10, 11, 14, 16.
Site: Dry, sun.
Fruit: Nutlike.

A small shrub; branches flexuous. Grazed by cattle, especially in winter.

Ephedra trifurca Torr. **Popotillo.**
Range: 10, 11.
Site: Dry, sun.
Fruit: Nutlike, available April–May.

A small, much-branched, often spinescent shrub; germination of seed at least 34 percent.

Stomach records: Scaled quail; mountain sheep. *Observations:* Jack rabbit, Mexican bighorn. Grazed by cattle, especially in winter.

Ephedra viridis Cov. **Mormon tea.**
Range: 9, 10, 11.
Site: Dry, sun.
Fruit: Nutlike; available in May.

A small shrub with crowded, erect, rigid, broomlike branches; flowers March–June; root system deep, fibrous, but scarcely spreading.

Stomach records: Black-tailed deer. *Observations:* Mule deer. An important browse for livestock.

Epibaterium carolinum, see *Cocculus carolinus.*

Ericameria arborescens, see *Aplopappus arborescens.*

Ericameria brachylepis, see *Aplopappus propinquus.*

Ericameria cuneatus, see *Aplopappus cuneatus.*

Ericameria ericoides, see *Aplopappus ericoides.*

Ericameria monactis, see *Aplopappus cooperi.*

Ericameria nana, see *Aplopappus nanus.*

Ericameria nelsonii, see *Aplopappus laricifolius.*

Ericameria palmeri, see *Aplopappus palmeri.*

Ericameria paniculata, see *Chrysothamnus paniculatus.*

Ericameria parishii, see *Aplopappus parishii.*

Ericameria pinifolia, see *Aplopappus pinifolius.*

Ericameria resinosa, see *Aplopappus nanus.*

Ericameria teretifolia, see *Chrysothamnus teretifolius.*

Eriodictyon angustifolium Nutt. **Narrowleaf yerba-santa.**
Range: 9, 10, 11.
Site: Dry, sun.
Fruit: Capsule.

A small to large evergreen shrub of very little value as forage, except to goats.

Eriodictyon californicum (Hook. and Arn.) Greene. **California yerba-santa**
E. glutinosum Benth.
Range: 1, 4.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A large evergreen shrub; flowers May–June; forms colonies, the plants of which may often be connected by lateral roots 3–4 inches deep; occurs on clay, sandy, rocky and other soils.

Observations: A fair browse for mule deer. Practically worthless as forage for livestock. A valuable honey plant.

Eriodictyon crassifolium Benth.
Range: 5.
Site: Dry, sun.
Fruit: Capsule.

A large colony-forming, evergreen shrub; occurs in sandy or gravelly soils.

Var. *traskiae* (Eastw.) Jeps., (*E. traskiae* Eastw.) is very similar to and occurs with the species. Var. *niveum* Brandeg., (*E. niveum* Eastw., *E. tomentosum* Benth.) occurs also in region 1.

Eriodictyon glutinosum, see *Eriodictyon californicum.*

Eriodictyon lanatum, see *Eriodictyon trichocalyx.*

Eriodictyon niveum, see *Eriodictyon crassifolium.*

Eriodictyon tomentosum, see *Eriodictyon crassifolium.*

Eriodictyon traskiae, see *Eriodictyon crassifolium.*

Eriodictyon trichocalyx Heller. **Yerba-santa.**
E. angustifolium pubens Brandeg.
Range: 5, 10.
Site: Dry, sun.
Fruit: Capsule.

A small openly-branched evergreen shrub; occurs on sandy, stony, and other soils; older leaves are often black with fungal growth; colony-forming.

Var. *lanatum* (Brandeg.) Jeps., (*E. lanatum* (Brandeg.) Abrams) occurs in region 10.

Eriogonum spp.

Available records of utilization by wildlife referred only to the genus may include more herbaceous than shrubby species.

Stomach records (in addition to specific records): Richardson's grouse; mountain sheep, antelope jack rabbit, California jack rabbit, Texas jack rabbit, black-tailed deer, Arizona cottontail. *Observations* (in addition to specific records): Bighorn.

Eriogonum arborescens Greene.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small to large, loosely branched, ornamental shrub.

Eriogonum cinereum Benth.
Range: 5.
Site: Dry, sun.
Fruit: Achene.

A small to large, freely branched shrub; occurs on coastal bluffs.

Eriogonum corymbosum Benth.
Range: 9, 11, 16.
Site: Dry, sun.
Fruit: Achene.

A small shrub; flowers June–September.

Eriogonum deserticola Wats.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small, much-branched shrub; occurs in sandy and other soils; branches leafless with age.

Eriogonum divergens Small.
E. corymbosus divaricatus Torr.
Range: 9, 11.
Site: Dry, sun.
Fruit: Achene.
A small shrub; flowers July–August.

Eriogonum effusum Nutt.
Range: 9, 15, 16.
Site: Dry, sun.
Fruit: Achene.
A small shrub; flowers July–September.

Eriogonum fasciculatum Benth. **California-buckwheat.**
Range: 5, 10.
Site: Dry, sun.
Fruit: Achene.

A small shrub; stems more or less decumbent; grows on the poorest soils and in the most exposed situations; casts a poor shade.

Var. *foliolosum* (Nutt.) Stokes, (*E. foliolosum* Nutt.) occurs in region 5. Var. *polifolium* (Benth.) Torr. and Gray (*E. polifolium* Benth.), occurs in region 10. Var. *flavoviride* Munz and Johnst., occurs in region 10 and is smaller than the species.

An important early spring feed for sheep, especially in times of scarcity of other forage. Of first importance as a honey plant.

Eriogonum fendlerianum, see *Eriogonum microthecum.*

Eriogonum foliolosum, see *Eriogonum fasciculatum.*

Eriogonum giganteum Wats.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Achene.
A small to large, coarse shrub.

Eriogonum heermannii Dur. and Hilg.
Range: 9, 10.
Site: Dry, sun.
Fruit: Achene.
A small shrub.

Eriogonum microthecum Nutt. **Slender buckwheatbrush.**
Range: 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15.
Site: Dry, sun.
Fruit: Achene, available September–November.

A small, much-branched shrub; flowers July–September. Of small importance as browse for livestock.

Var. *fendlerianum* Benth. (*E. fendlerianum* (Benth.) Small), occurs from Colorado to New Mexico.

Eriogonum nebraskense Rydb.
Range: 15.
Site: Dry, sun.
Fruit: Achene.
A small, spreading shrub with short branches; flowers in July.

Eriogonum nodosum Small.
Range: 10.
Site: Dry, sun.
Fruit: Achene.
A small shrub.

Eriogonum parvifolium Smith. (pl. 14, *A*).
Range: 5.
Site: Dry, sun.
Fruit: Achene.

A small, loosely-branched, decumbent to prostrate shrub; taproot deep and with lateral roots spreading out three times as far as the parts above ground; occurs on sand dunes or hillsides.

Eriogonum polifolium, see *Eriogonum fasciculatum.*

Eriogonum salinum Nels.
Range: 9.
Site: Dry, sun.
Fruit: Achene.

A small shrub; flowers June–July; occurs on saline soil.

Eriogonum simpsonii Benth.
E. microthecum leptophyllum Torr. and Gray.
Range: 9, 11.
Site: Dry, sun.
Fruit: Achene.

A small shrub; flowers July–August.

Eriogonum sulcatum Wats.
Range: 9, 10.
Site: Dry, sun.
Fruit: Achene.

A small, diffusely-branched shrub; flowers April–May.

Eriogonum wrightii Torr. **Wright's buckwheatbrush**
Range: 3, 9, 10, 11, 14.
Site: Dry, sun.
Fruit: Achene.

A small, much-branched shrub; leafy in the lower half; flowers June–November; germination of seed not less than 22 percent.

Var. *subscaposum* Wats. makes a dense, leafy mat, has leafy branches shorter than the species, and occurs in regions 9 and 10.

Observations: An excellent forage for deer; highly palatable to captive deer; characterized as the most important single forage for large game animals in Arizona. Fair browse for livestock.

Erythrina arborea (Chapm.) Small. **Red-cardinal.**
E. herbacea arborea Chapm.
Range: 17, 30, 31, 32.
Site: Well-drained, sun.
Fruit: Legume.

A large shrub to small or large tree, or vine; stems solitary or thickly tufted; thorny; occurs in sandy soils.

Erythrina flabelliformis Kearney. **Coralbean.**
E. purpusii Brandeg.
Range: 11.
Site: Dry, sun.
Fruit: Legume.

A large shrub to small tree; spiny; seed germination 20–40 percent; of some value as forage for livestock; seed, bark, and stems are more or less poisonous, but probably do not cause much trouble to livestock except on overgrazed range.

Erythrina purpusii, see *Erythrina flabelliformis.*

Esenbeckia runyonii Mort.
Range: 17.
Site: Well-drained, sun.
Fruit: Woody capsule, available in April.

A small or rarely a large tree; flowers in July.

Eubotrys elongata, see *Leucothoë elongata.*

Eubotrys racemosa, see *Leucothoë racemosa.*

Eubotrys recurva, see *Leucothoë recurva.*

Eucnide urens Parry. **Rock-nettle.**
Range: 9, 10.
Site: Dry, sun.
Fruit: Capsule.

A small shrub; flowers in May; armed with stinging hairs; stems often decumbent.

Eurphorbia misera Benth.
Range: 5, 10.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small shrub or rarely a large shrub to small tree; much branched; straggling.

Eurotia lanata (Pursh) Moq. (pl. 14, *B*). Winterfat.
E. subspinosa Rydb.
Range: 3, 4, 6, 7, 8, 9, 10, 11, 14, 15, 16.
Site: Dry, well-drained, sun.
Fruit: Achene, available September–October.

A small dioecious or monoecious shrub; occurs on subalkaline soils; branches slender, many from the base; very rapid growing; root system spreading but deep; seed produced in great abundance; 91,000 seeds per pound, vitality transient; in direct seeding sown 3 to 4 pounds per acre; germination of seed 30–70 percent.

Observations: Important winter browse for elk; California mule deer. Very valuable forage for sheep and cattle, particularly in the winter and fall; considered very fattening for livestock.

Eurotia subspinosa, see *Eurotia lanata.*

Evonymus sp.

Observations (in addition to specific records): Fox sparrow, mockingbird.

Evonymus americanus L. **Strawberrybush.**
Range: 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule; available September–October; seeds with a fleshy aril.

A small to large shrub; flowers May-June; stems often creeping or trailing, rooting at the nodes, or semierect; propagation is by seed stratified and sown in spring; 30,000 seeds per pound.

Stomach records: Five species of birds.

Evonymus atropurpureus Jacq. **Burningbush.**
Range: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Capsule; available August–November; seeds with a fleshy aril.

A small to large shrub or rarely a small tree to large tree; flowers May–June; subject to scale and fungus attack; bark medicinal; propagation is by seed stratified and sown in spring; 40,000 seeds per pound, germination about 70 percent, about 8,000 usable plants per pound of seed.

Stomach records: Three species of birds including Hungarian partridge. *Observations:* Palatable to rodents, possibly to deer. A drastic purgative to livestock but seldom browsed.

Evonymus obovatus Nutt. **Running strawberrybush.**
Range: 24, 25, 27.
Site: Well-drained, sun, shade.
Fruit: Capsule, available August–October; seed with a fleshy aril.

A small, spreading shrub or trailing vine; thicket or mat forming; branches rooting at the nodes; flowers April–May; propagation is by seed stratified and sown in spring.

Evonymus occidentalis Nutt. **Western burningbush.**
Range: 1, 2, 4, 12.
Site: Well-drained, moist, shade.
Fruit: Capsule, available July–October; seed with a fleshy aril.

A large shrub or rarely small tree; branches slender, straggling; flowers May–June; propagation is by seed stratified and sown in spring.

Var. *parishii* Jeps., (*E. parishii* Trel.) is found in the southern California mountains.

Stomach records: Robin. Not browsed by stock.

Evonymus parishii, see *Evonymus occidentalis.*

Eysenhardtia amorphoides, see *Eysenhardtia polystachya.*

Eysenhardtia cobriformis, see *Eysenhardtia polystachya.*

Eysenhardtia orthocarpa, see *Eysenhardtia polystachya.*

Eysenhardtia polystachya (Orteg.) Sarg. **Kidneywood.**

E. amorphoides H. B. K., *E. orthocarpa* (Gray) Cockerell, *E. orthocarpa* Wats., *E. reticulata* Penn., *E. subcoriacea* Pennell, *E. cobriformis* Pennell, *E. texana* Scheele, *Viborquia polystachya* Orteg.

Range: 10, 11, 17, 20.
Site: Dry, sun.
Fruit: Legume, available in September.

A large shrub to small or rarely large tree; flowers in May; fruit borne sparingly; germination of seed about 50 percent.

Observations: Particularly palatable to captive deer. A valuable honey plant. Good goat browse, and in southeastern Arizona one of the best summer and fall browses for horses and cattle.

Eysenhardtia reticulata, see *Eysenhardtia polystachya.*

Eysenhardtia subcoriacea, see *Eysenhardtia polystachya.*

Eysenhardtia texana, see *Eysenhardtia polystachya.*

Fagara clava-herculis, see *Xanthoxylum clava-herculis.*

Fagara fagara, see *Xanthoxylum fagara.*

Fagara pterota, see *Xanthoxylum fagara.*

Fagus americana, see *Fagus grandifolia.*

Fagus grandifolia Ehrh. **Beech.**

F. americana Sweet.

Range: 20, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, sun, shade.
Fruit: Nut, available September–October.

A large tree; occurs on many slightly acid soils except sand; root system shallow and spreading; subject to sunscald; easily injured by fire and late frosts; root sprouts common; generally free from insect attack; wood used commercially; grass ordinarily will not grow under this tree; seeds often abortive; 1,400–1,800 seeds per pound, germination 80 percent, about 250 usable plants per pound of seed.

Stomach records: Ten species of birds, including ruffed grouse; opossum, raccoon, gray and red fox, white-tailed deer; found in 21.3 percent of raccoon stomachs examined November–January in New York. *Observations:* Fifteen species of birds, including bobwhite, ruffed grouse, wild turkey, and ring-necked pheasant; black bear; preferred food of flying squirrel; white-tailed deer, Virginia opossum, cottontail rabbit, red squirrel, red fox, gray fox, porcupine; a most important food of raccoon in fall and early winter.

Fallugia acuminata, see *Fallugia paradoxa.*

Fallugia paradoxa (Don) Endl. (pl. 14, *C*). **Apache-plume.**

F. acuminata Cockerell, *F. paradoxa acuminata* Woot., *F. micrantha* Cockerell, *Sieversia paradoxa* Don.

Range: 9, 10, 11, 13, 14, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Achene, available August–November.

A small to large, freely-branched, somewhat straggling, shrub; evergreen; flowers May–September; rapid growing when supplied with water; does not reach full height unless protected from grazing; seeds germinate well as soon as planted at 60–70° F.; direct seeding experiments in New Mexico were unsuccessful; germination of seed 30–60 percent.

Palatability fair to low for sheep, goats, and cattle; endures grazing well.

Fatsia horrida, see *Oplopanax horridum.*

Fendlera falcata Thornb.

Range: 13, 14.
Site: Dry, sun.
Fruit: Capsule.

A small to large shrub; flowers May–July.

Fendlera rupicola Gray.
Range: 9, 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Capsule, available July–August.

A large shrub; flowers May–June; will endure intense heat and considerable drought.

Observations: Much used by captive deer. Palatability high for goats in New Mexico, and closely grazed by cattle in central Arizona.

Fendlera tomentella Thornb.
Range: 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small to large shrub.

Fendlera wrightii (Gray) Heller.
F. rupicola wrightii Gray.
Range: 11.
Site: Dry, sun.
Fruit: Capsule.

A small shrub; flowers May–June.

Fendlerella cymosa, see *Fendlerella utahensis.*

Fendlerella utahensis (Wats.) Heller.
F. cymosa Greene, *Whipplea utahensis* Wats.
Range: 9, 10, 11, 13, 14.
Site: Dry, sun.
Fruit: Capsule.

A small, spreading, densely-branched shrub.

Stomach records: Black-tailed deer.

Flourensia cernua DC. **Blackbrush.**
Helianthus cernuus Benth. and Hook.
Range: 11, 16, 17.
Site: Dry, sun.
Fruit: Achene.

A small to large, much-branched, erect or procumbent shrub; occurs on sandy and other soils.

Observations: Somewhat eaten by jack rabbits. Not browsed by livestock except under extreme conditions.

Forestiera spp.

Observations (in addition to specific records): Mexican raccoon.

Forestiera acuminata (Michx.) Poir. Forestiera.
Adelia acuminata Michx.
Range: 20, 22, 25, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available May–October.

A large shrub, less commonly a small to large tree; flowers March–April; somewhat spiny; thicket forming; fruit much attacked and distorted by insects, but on falling into water keeps in perfect condition far into the succeeding spring.

Stomach records: Wood duck, mallard. *Observations:* A good duck food.

Forestiera angustifolia Torr.
Adelia angustifolia (Torr.) Kuntze.
Range: 11, 17, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe, available in June.

A small to large, densely branched, stiff evergreen shrub.

Stomach records: Scaled quail. *Observations:* Much eaten by scaled quail; extensively eaten by gray fox.

Forestiera ligustrina (Michx.) Poir.
Adelia ligustrina Michx.
Range: 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe.

A large, widely branched shrub; often occurs on limestone or sandy soils.

Forestiera neomexicana Gray. **Paloblanco.**
F. parvifolia Small, *F. acuminata parvifolia* Gray, *Adelia neomexicana* (Gray) Kuntze., *A. parvifolia* (Gray) Small.
Range: 4, 9, 10, 11, 13, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Drupe, available June–September.

A small or commonly large, spiny, much-branched, spreading shrub; germination of seed 40–70 percent.

Forestiera parvifolia, see *Forestiera neomexicana.*

Forestiera phillyreoides (Benth.) Torr.
Piptolepis phillyreoides Benth.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Drupe.

A large shrub to small tree; thicket-forming; fruit dropped as soon as ripe.

Forestiera pubescens Nutt. **Elbow bush.**
Adelia pubescens (Nutt.) Kuntze.
Range: 11, 16, 17, 20, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe, available June–October.

A small to large, widely branched shrub; recurved branches root where they touch the ground; propagation is by cuttings or seeds; has been recommended as a good erosion control and wildlife cover plant.

Forestiera reticulata Torr.
Range: 16, 17.
Site: Well-drained, sun.
Fruit: Drupe.

A large shrub to small tree; evergreen.

Forestiera sphaerocarpa Torr.
Range: 17.
Site: Dry, well-drained, sun.
Fruit: Drupe.

A small evergreen shrub.

Forsellesia mionandra (Koehne) Heller.
Glossopetalon mionandrum Koehne.
Range: 13.
Site: Dry, sun.
Fruit: Follicle.

A small, spinescent, intricately-branched shrub.

Forsellesia nevadensis, see *Forsellesia spinescens.*

Forsellesia pungens (Brandeg.) Heller. **Dwarf greasebush.**
Glossopetalon pungens Brandeg.
Range: 10.
Site: Dry, sun.
Fruit: Follicle.

A very small shrub with weak branches; often occurs in rocky soils.

Forsellesia spinescens (Gray) Greene. **Spiny greasebush.**
F. nevadensis (Gray) Greene, *Glossopetalon spinescens* Gray, *G. nevadense* Gray.
Range: 7, 8, 9, 10, 11, 16.
Site: Dry, sun.
Fruit: Follicle.

A small, spiny, intricately-branched shrub; flowers February–May; occurs most commonly on limestone, but can grow on granite; a pioneer species.

Observations: Mule deer. Close-cropped by sheep in Utah.

Fothergilla spp.

Propagation of all species is by seeds which do not germinate until the second year or by layers which take 2 years to root.

Fothergilla alnifolia, see *Fothergilla gardenii.*

Fothergilla carolina, see *Fothergilla gardenii.*

Fothergilla gardenii Murr. **Dwarf witch-alder.**
F. carolina Britt., *F. alnifolia* L. f.
Range: 29, 30.
Site: Well-drained, moist, sun.
Fruit: Capsule, available July–August.

A small shrub; flowers April–May; usually occurs in sandy soil; free from insects and disease; propagation is by seed stratified and sown in spring, or by suckers or root cuttings.

Fothergilla major Lodd. **Witch-alder.**
Range: 27.
Site: Moist, shade.
Fruit: Capsule, available in September.

A small to large, much-branched shrub; flowers in May; foliage rather dense; free from insects and disease; propagation is by seed stratified and sown in spring.

Fothergilla monticola Ashe.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Capsule.

A small to large shrub; flowers April–May; very like *F. major* but more spreading.

Fothergilla parvifolia Kearney. **Creeping witch-alder.**
Range: 29, 30.
Site: Well-drained, sun, shade.
Fruit: Capsule.

A small shrub; occurs in sandy and other soils; forms extensive clumps by means of long underground stems; free from insects and disease; propagation is by seed stratified and sown in spring.

Fouquieria splendens Engelm. **Ocotillo.**
Range: 10, 11, 16.
Site: Dry, sun.
Fruit: Capsule.

A large, spiny shrub; stems simple, several from one base; leafless most of the year; of no recorded forage value; flowers and fruit a source of food for Indians.

Frankenia jamesii Torr.
Range: 11.
Site: Dry, sun.
Fruit: Capsule.

A small shrub; occurs on alkaline soil.

Frankenia palmeri Wats. **Yerba reuma.**
Range: 5.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small shrub; flowers June–July; often occurs in salt marshes.

Franseria albicaulis, see ***Franseria dumosa.***

Franseria ambrosioides Cav. **Ambrosia bur-sage.**
Range: 5, 10, 11.
Site: Dry, well-drained, sun.
Fruit: Bur.

A small to large shrub.

Franseria dumosa Gray. **White bur-sage.**
F. albicaulis Torr., *Gaertneria dumosa* Kuntze.
Range: 5, 9, 10.
Site: Dry, sun.
Fruit: Bur.

A small, much-branched, compact, spiny shrub; locally valuable as feed for cattle and sheep.

Franseria eriocentra Gray. **Woolly bur-sage.**
Gaertneria eriocentra Kuntze.
Range: 9, 10.
Site: Dry, sun.
Fruit: Bur.

A small, rigid, spreading shrub; usually occurs on sandy soil.

Franseria ilicifolia Gray. **Hollyleaf bur-sage.**
Gaertneria ilicifolia Kuntze.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Bur.

A small, rigid, much-branched, evergreen shrub; usually occurs on sand; leaves somewhat spiny.

Fraxinus spp. **Ash.**

All species usually occur on neutral soil; propagation is by seed stratified at 32°–50° F. for 30 to 90 days and sown in spring, or sown directly in the fall although seeds sometime remain dormant until the second year; rapid growing when young; usually easily transplanted.

Stomach records (in addition to specific records): Seven species of birds, including bobwhite; white-tailed deer. *Observations* (in addition to specific records): Five species of birds; an important food of white-tailed deer in Massachusetts; porcupine; a reserve food and building material for beaver. Important source of pollen for bees.

Fraxinus americana L. **White ash.**
Range: 20, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Well-drained, sun.
Fruit: Samara, available October–November.

A large tree; occurs on many kinds of soil; flowers April–June; root system fibrous, deep; rapid growing; much attacked by borers; not extensively damaged by fungi; much cultivated; wood of great importance commercially; 6,000 seeds per pound, germination of seed 40 percent, about 1,500 usable plants per pound of seed.

Var. *microcarpa* Gray is a shrub ordinarily growing in drier situations and bearing smaller fruit.

Observations: Purple finch, pine grosbeak; cottontail rabbit, porcupine, white-tailed deer.

Fraxinus anomala Wats. **Dwarf ash.**
Range: 9, 10, 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Samara.

A large shrub to small tree; 22,000 seeds per pound, about 5,000 usable plants per pound of seed. Provides at least poor and sometimes fair to fairly good browse for goats, sheep, and cattle.

Fraxinus attenuata, see *Fraxinus velutina.*

Fraxinus berlandieriana DC. **Mexican ash.**
Range: 11, 16, 17, 20, 30.
Site: Well-drained, sun.
Fruit: Samara, available in May.

A large dioecious tree.

Fraxinus biltmoreana Beadle. **Biltmore white ash.**
Range: 22, 25, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Samara.

A large dioecious tree; flowers April–May; very similar to *F. americana* but more hairy.

Fraxinus californica, see *Fraxinus oregona.*

Fraxinus caroliniana Mill. **Water ash.**
F. caroliniana rehderiana Sarg., *F. platycarpa* Michx.
Range: 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Samara.

A large dioecious tree; flowers March–April.

Fraxinus coriacea, see *Fraxinus velutina.*

Fraxinus cuspidata Torr. **Flowering ash.**
Range: 11, 14, 17.
Site: Well-drained, sun.
Fruit: Samara.

Usually a large shrub, more rarely a small or large tree; flowers April–May; commonly arborescent southward but mostly in Mexico; often thicket-forming; 16,000 seeds per pound. Provides poor and sometimes fair to fairly good browse for goats, sheep, and cattle.

Var. *macropetala* (Eastw.) Rehder, (*F. macropetala* Eastw.) differs from the species in bearing three, five, and seven foliate leaves.

Fraxinus darlingtonii, see *Fraxinus pennsylvanica.*

Fraxinus dipetala Hook. and Arn. **Flowering ash.**
Range: 1, 3, 4, 5.
Site: Dry, well-drained, sun.
Fruit: Samara.

A large shrub.

Observations: California mule deer.

Fraxinus floridana, see *Fraxinus pauciflora.*

Fraxinus glabra, see *Fraxinus velutina.*

Fraxinus greggii Gray. **Littleleaf ash.**
F. schiedeana parvifolia Torr.
Range: 11, 17.
Site: Dry, well-drained, sun.
Fruit: Samara.

A small to large tree.

Fraxinus lanceolata, see *Fraxinus pennsylvanica.*

Fraxinus lowellii Sarg.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Samara, available in July.

A small to large tree; possibly closely related to *F. anomala.*

Fraxinus macropetala, see *Fraxinus cuspidata.*

Fraxinus michauxii Britt.
Range: 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Samara.

A large tree; flowers April–May.

Fraxinus nigra Marsh. **Black ash.**
F. sambucifolia Lam.
Range: 22, 24, 25, 26, 27, 28.
Site: Well-drained, moist, sun.
Fruit: Samara; available June–September, falling or persistent until spring.

A large perfect or dioecious tree; flowers April–May; root system shallow; easily wind thrown; severely damaged by fire but quite free from fungus and insect damage; coppices poorly; wood used commercially; vitality of seeds low; 3,000 seeds per pound.

Observations: Evening grosbeak; cottontail rabbit.

Fraxinus oregona Nutt. **Oregon ash.**
F. californica Hort.
Range: 1, 2, 3, 4, 5.
Site: Well-drained, moist, sun.
Fruit: Samara; available September–October, partially persistent 3 to 12 months.

A large dioecious tree; flowers April–May; rapid growing, relatively long-lived; free from disease; wood of importance commercially; comes into leaf late in spring and sheds its foliage early in the fall; fruit produced in great quantities; 10,000 seeds per pound, vitality persistent.

Observations: Western evening grosbeak. A fairly important cattle browse and good local browse for sheep and goats.

Fraxinus papillosa, see *Fraxinus velutina.*

Fraxinus pauciflora Nutt. **Water ash.**
F. floridana Sarg.
Range: 29, 30, 31.
Site: Moist, sun.
Fruit: Samara.
A large dioecious tree; flowers in March; more abundant southward.

Fraxinus pennsylvanica Marsh. **Red ash.**
F. darlingtonii Britt., *F. smallii* Britt.
Range: 15, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, sun.
Fruit: Samara, available September–October.
A large dioecious tree; flowers April–May; root system shallow; fairly immune from insects and fungus diseases; easily injured by fire; rapid growing when young, later slower; coppice does not develop into large trees; wood used commercially; 11,000 seeds per pound, germination 50 percent. Between this and its varieties occur many intergrading forms.

Var. *lanceolata* Sarg., the green ash (*F. viridis* Michx. f., *F. lanceolata* Borkh.) will grow in much drier situations than the species and occurs in regions 12 and 17 in addition to the areas noted for the species; root system shallow, widespreading; rapid growing when young, later slower; grows on coal-stripped lands in Illinois; not short-lived; generally free from insects and diseases; easily injured by fire; 16,000–17,000 seeds per pound, germination about 85 percent, about 3,000 usable plants per pound of seed. Also considered a separate species and rather distinct in the East but much less so westward.

Observations: Three species of birds; white-tailed deer, cottontail rabbit, snowshoe hare.

Fraxinus pistaciaefolia, see *Fraxinus velutina.*

Fraxinus platycarpa, see *Fraxinus caroliniana.*

Fraxinus profunda Bush. **Pumpkin ash.**
F. americana profunda Britt.
Range: 25, 27, 29, 30.
Site: Well-drained, sun.
Fruit: Samara, available September–October.
A large dioecious tree; flowers April–May; leaves very large.

Fraxinus quadrangulata Michx. **Blue ash.**
Range: 22, 23, 24, 25, 27, 29.
Site: Dry, well-drained, sun.
Fruit: Samara, available June–October.
A large, perfect or dioecious tree; flowers March–April; occurs on limestone and other soils; root system shallow, spreading; grows on drier soils than any other of the ashes in their native habitats; rapid growing, rather short-lived; wood most durable of all ashes, used commercially; 7,000 seeds per pound.

Fraxinus sambucifolia, see *Fraxinus nigra.*

Fraxinus smallii, see *Fraxinus pennsylvanica.*

Fraxinus standleyi, see *Fraxinus velutina.*

Fraxinus texensis (Gray) Sarg. **Texas ash.**
F. americana texensis Gray.
Range: 16, 17, 20, 25.
Site: Dry, well-drained, sun.
Fruit: Samara.
A large dioecious tree; flowers in March; often occurs on limestone soil.

Fraxinus toumeyi, see *Fraxinus velutina.*

Fraxinus velutina Torr. **Velvet ash.**
F. pistaciaefolia Torr., *F. glabra* Thornb., *F. velutina glabra* (Thornb.) Rehd., *F. papillosa* Lingels., *F. standleyi* Rehder., *F. standleyi lasia* Rehder.
Range: 9, 10, 11, 14, 16, 17, 20.
Site: Well-drained, moist, sun.
Fruit: Samara, available in September.

A small to large, dioecious, almost evergreen tree; flowers March–April; 13,000–40,000 seeds per pound. An extremely variable species, the following apparently reasonably well separated; Var. *toumeyi* (Britt.) Rehd. (*F. attenuata* Jones in part., *F. toumeyi* Britt.) occurs with the species but is most common in Arizona; said to be the most alkali- and drought-resistant form; 10,000 seeds per pound.

Var. *coriacea* (Wats.) Rehd. (*F. coriacea* Wats., *F. pistaciaefolia coriacea* Gray, *F. americana pistaciaefolia* Wenz), the desert ash, occurring in regions 9 and 10, is of some value as early-spring and late-fall browse for stock; 29,000 seeds per pound. Var. *glabra* (Thornb.) Rehder (*F. glabra* Thornb.), the smooth ash, occurs within the range of the species.

Fraxinus viridis, see *Fraxinus pennsylvanica.*

Fremontia californica Torr. **California fremontia.**
F. mexicanum McBr., *Fremontodendron californicum* Cov., *F. mexicanum* Davids.
Range: 3, 4, 5, 10, 11.
Site: Dry, sun.
Fruit: Capsule.

A large shrub to small tree; evergreen; flowers May–July; foliage thin; grows on very poor soils; not tolerant of excess moisture or poor drainage; an abundant seeder.

Observations: Of slight forage value for mule deer. Fair to good browse for cattle and goats.

Fremontia mexicana, see *Fremontia californica.*

Fremontodendron californicum, see *Fremontia californica.*

Fremontodendron mexicanum, see *Fremontia californica.*

Gaertneria dumosa, see *Franseria dumosa.*

Gaertneria eriocentra, see *Franseria eriocentra.*

Gaertneria ilicifolia, see *Franseria ilicifolia.*

Garrya spp.

Propagation of all species is by seeds, layers, or half-ripe cuttings under glass.

Garrya buxifolia, see *Garrya flavescens.*

Garrya elliptica Dougl. **Tasseltree.**
Range: 1, 4.
Site: Dry, well-drained, sun.
Fruit: Berry, available June–August.

Commonly a small to large shrub, rarely a small tree; flowers January–March.

Garrya flavescens Wats. **Silktassel.**
G. pallida Eastw.
Range: 4, 5, 9, 10, 11, 13.
Site: Dry, sun.
Fruit: Berry, available July–August.

A large, dioecious, spreading shrub; flowers April–May.

Browsed to some extent by livestock and suffers no injurious effects from grazing up to 25 percent.

Var. *buxifolia* (Gray) Jeps., (*G. buxifolia* Gray) occurs in regions 1 and 4 and is lower than the species.

Garrya fremontii Torr. **Fremont silktassel.**
Range: 4, 5.
Site: Dry, sun.
Fruit: Berry, available August–September.

A large evergreen shrub; flowers February–March. Considered a good browse for cattle.

Observations: California mule deer.

Garrya goldmanii, see *Garrya ovata.*

Garrya lindheimeri, see *Garrya ovata.*

Garrya lindheimeri Torr. **Silktassel bush.**
Range: 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Berry, available September–October.

A small to large shrub, or where moisture is plentiful, a small to large tree; almost evergreen; flowers April–May.

Garrya ovata Benth.
G. goldmanii Woot. and Standl., *G. lindheimeri* Torr.
Range: 11, 16, 20.
Site: Dry, sun.
Fruit: Berry.

A small to large evergreen shrub; occurs on limestone and other soils. Considered a good feed for goats.

Garrya pallida, see *Garrya flavescens.*

Garrya veatchii Kellogg. **Canyon tasselbush.**
G. flavescens palmeri Wats., *G. veatchii palmeri* Eastw.
Range: 1, 4, 5.
Site: Dry, sun.
Fruit: Berry.

A large shrub; flowers January–May.
Observations: Of slight importance as browse for mule deer.

Garrya wrightii Torr. **Wright's silktassel.**
Range: 11, 14.
Site: Dry, sun.
Fruit: Berry, available August–September.

A large evergreen shrub; flowers June–August; resistant to drought; apparently the hardiest of all species of *Garrya;* transplantation difficult; cuttings rarely successful.
Stomach records: Mountain sheep. *Observations:* Arizona white-tailed deer, Mexican bighorn. Locally of some forage value for livestock.

Gaultheria humifusa (Graham) Rydb.
G. myrsinites Hook., *Vaccinium humifusa* Graham.
Range: 1, 4, 12, 13.
Site: Well-drained, sun.
Fruit: Berry, available August–September.

A small evergreen shrub or vine; flowers in August; stems procumbent, rooting; propagation is by seed sown under glass in winter or spring.
Stomach records: Plains white-tailed deer. *Observations:* Quail, grouse; deer.

Gaultheria myrsinites, see *Gaultheria humifusa.*

Gaultheria ovatifolia Gray. **Bush wintergreen.**
Range: 4, 12.
Site: Well-drained, sun.
Fruit: Berry, available August–September.

A small evergreen shrub; propagation is by seed sown under glass in winter or spring.
Observations: Grouse, quail; deer.

Gaultheria procumbens L. **Teaberry.**
Range: 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available August–June.

A small evergreen shrub; flowers May–September; occurs in sandy or other soils; stems creeping on or below the surface, forming mats; berry gradually increasing in size over winter; 1 ton of leaves produces 1 pound of oil of wintergreen; propagation is by seed sown under glass in winter or spring, or by division; 2,800 fresh berries per pound.
Stomach records: Seven species of birds, including ruffed grouse, bobwhite, sharp-tailed grouse, and ring-necked pheasant; mountain sheep, white-tailed deer. *Observations:* Six species of birds, including bobwhite, ruffed and spruce grouse; white-tailed deer; a favorite food of eastern chipmunk.

Gaultheria shallon Pursh. (pl. 15, *A. B*). **Salal.**
Range: 1, 2, 4, 12.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available July–December.

A small to large evergreen shrub; flowers May–June; when occurring in dry, sunny situations the species becomes much dwarfed; apparently needs a very humid atmosphere for best growth; forms a dense cover, more especially on sandy soil; most robust near the sea; propagation is by seed sown under glass in winter or spring.

Stomach records: Wren tit. *Observations:* Blue grouse, band-tailed pigeon, sooty grouse; Columbian black-tailed deer, Townsend's chipmunk, brown mountain beaver, Olympic black bear; emergency ration for Olympic wapiti, an important food of Roosevelt elk. Not palatable to livestock.

Gaylussacia spp.

Propagation of all species is by seed sown under glass in winter or spring.

Stomach records (in addition to specific records): Fifty-one species of birds, including ruffed grouse, bobwhite, wild turkey, sharp-tailed grouse, ring-necked pheasant; opossum. *Observations:* White-winged crossbill; ranked with *Vaccinium* as twenty-ninth on the list of quail food plants in the Southeast; bear.

Gaylussacia baccata (Wang.) Koch. **Black huckleberry.**
G. resinosa (Ait.) Torr, and Gray, *Andromeda baccata* Wang., *Decachaena baccata* (Wang.) Small.
Range: 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Berry; available July–September.

A small, much-branched, rigid shrub; flowers May–June; occurs in sandy and other, usually acid soils; many fruit-color varieties occur within the range of the species.

Stomach records: Six species of birds, including ruffed grouse, sharp-tailed grouse, greater prairie chicken; composed 1.9 percent of entire amount of fall food taken by sharp-tailed grouse in Wisconsin; taken by 3 out of 17 fall-collected prairie chickens in Wisconsin; white-tailed deer. *Observations:* Ruffed grouse, bobwhite, wild turkey, mourning dove.

Gaylussacia brachycera (Michx.) Gray. **Box huckleberry.**
Vaccinium brachycerum Michx., *Buxella brachycera* (Michx.) Small.
Range: 27, 28.
Site: Dry, well-drained, sun.
Fruit: Berry; available July–August.

A small evergreen shrub; flowers May–June; forms extremely dense colonies, each representing a single plant; usually occurs in acid soils, including very poor ones; seed often produces sterile fruit; best developed in southeastern West Virginia.

Observations: Ruffed grouse.

Gaylussacia dumosa (Andr.) Torr. and Gray. **Dwarf huckleberry.**
Vaccinium dumosum Andr., *Lasiococcus dumosus* (Andr.) Small.
Range: 24, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Berry; available June–October.

A small shrub; evergreen southward; flowers May–June; occurs in sandy and other soils, often swamps; stems are produced from a creeping rootstock.

Var. *hirtella* (Ait.f.) Gray, (*G. hirtella* (Ait.) Klotz., *Lasiococcus mosieri* Small), occurs within the range of the species.

Gaylussacia frondosa (L.) Torr. and Gray. **Dangleberry.**
Vaccinium frondosum L., *Decachaena frondosa* (L.) Torr. and Gray.
Range: 25, 27, 28, 29.
Site: Dry, well-drained sun.
Fruit: Berry; available June–September.

A small to large, widely-branched, shrub; flowers May–June. A dwarf form has been described as var. *tomentosa* Gray.

Stomach records: Two species of birds. *Observations:* Ruffed grouse, bobwhite, cedar waxwing.

Gaylussacia hirtella, see *Gaylussacia dumosa.*

Gaylussacia nana (Gray) Small.
Decachaena nana (Gray) Small.
Range: 29, 30.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small shrub; usually occurs in sand; spreads by means of underground stems.

Gaylussacia resinosa, see *Gaylussacia baccata.*

Gaylussacia tomentosa (Pursh) Chapm.
Decachaena tomentosa (Pursh) Small.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Berry.

A small shrub; occurs in sandy soil; stem unbranched; spreading by underground stems.

Gaylussacia ursina (Curtis) Torr. and Gray. **Bear huckleberry.**
Decachaena ursina (Curtis) Small.
Range: 27, 28.
Site: Well-drained, sun, shade.
Fruit: Berry; available July–August.

A small, loosely-branched shrub; flowers May–June; often occurs in acid humus.

Gelsemium rankinii Small.
Range: 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.

An evergreen vine.

Gelsemium sempervirens (L.) Ait. **Yellow jessamine.**
Bignonia sempervirens L.
Range: 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Capsule.

An evergreen vine; flowers March–October; stems and branches often tangled and matted. Poisonous to livestock.

Stomach records: Bobwhite. *Observations:* Captive marsh rabbit.

Genista tinctoria L. **Dyer's greenweed.**
Range: 27.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small shrub; flowers June–July; introduced from Europe but naturalized in the region indicated; free from insects and disease; propagation is by seed.

Geobalanus oblongifolius, see *Chrysobalanus oblongifolius.*

Glabraria geniculata (Walt.) Britt. **Pond spice.**
Litsea geniculata (Walt.) B. and H.
Range: 25, 28, 29, 30.
Site: Moist, sun.
Fruit: Drupe.

A large, much-branched shrub; flowers March–April.

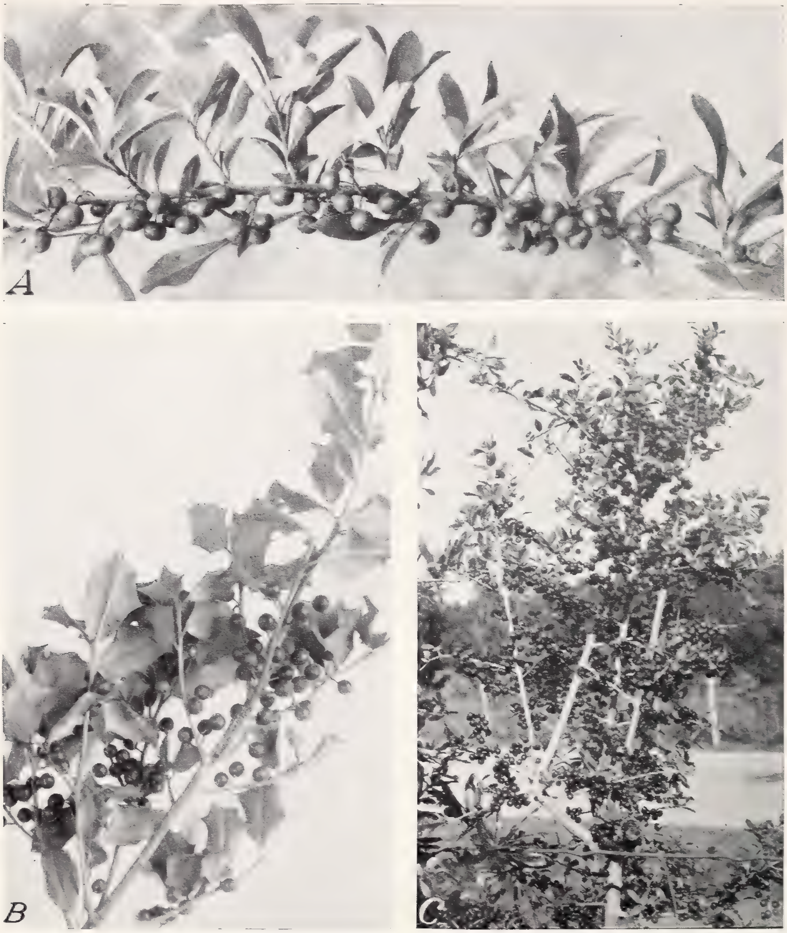
Gleditsia aquatica Marsh. **Waterlocust.**
Range: 20, 25, 28, 29, 30.
Site: Moist, sun.
Fruit: Legume, available August–September.

A large tree; flowers in July; sometimes forms large thickets in comparatively deep water; rarely attacked by insect pests; wood somewhat used for fence posts; propagation is by seed stratified and soaked in hot water before sowing in spring.

Gleditsia texana, see *Gleditsia triacanthos.*

Gleditsia triacanthos L. **Honeylocust.**
Range: 16, 20, 22, 23, 24, 25, 26, 27, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Legume, available September–February.

Gaultheria shallon: A, Effective stabilization of sand on the Oregon coast accomplished by a dense ground cover of salal. *B,* A near view of the fruit borne abundantly by the salal plants in *A.* These fruits are relished by man as well as by wildlife.



A, *Ilex longipes*. The fruit of this holly is produced in great abundance and is undoubtedly of some wildlife value. *B*, *I. opaca*. Fruiting branches of this dense-foliaged species find a ready market at Christmas time. The berries are relished by many kinds of birds. *C*, *I. vomitoria*. Yaupon in the sandy soil of northern Florida. Its fruit, relished by birds and produced in great quantity, should assure it an important place in wildlife plantings.

A large thorny tree; flowers May–July; foliage sparse; usually occurs on alluvial soils; very resistant to drought; somewhat tolerant of salinity; root system deep, widespreading or superficial; rapid growing, rather long-lived; wind-firm; free from disease and insects; badly injured by fire; widely cultivated; root nodules not formed; coppices freely; grows in many kinds of soils; wood very durable, used commercially; easily transplanted; propagation is by seeds stratified and soaked in hot water before sowing in spring; about 3,000 seeds per pound, germination 73–90 percent, about 1,000 usable plants per pound of seed. A probable hybrid between this and *G. aquatica* has been described as *G. texana* Sarg. There is a thornless variety (var. *inermis* Pursh.)

Stomach records: Bobwhite, starling. *Observations:* White-tailed deer, snowshoe hare, cottontail rabbit, gray squirrel. Fruit greedily eaten by cattle.

Glossopetalon mionandrum, see *Forsellesia mionandrum.*

Glossopetalon nevadense, see *Forsellesia spinescens.*

Glossopetalon pungens, see *Forsellesia pungens.*

Glossopetalon spinescens, see *Forsellesia spinescens.*

Gordonia lasianthus (L.) Ellis. **Loblolly bay.**
Range: 29, 30.
Site: Moist, sun.
Fruit: Capsule.

A large shrub to small or large tree; flowers in July; short-lived.

Grayia brandegei Gray. **Spineless hop-sage.**
Range: 9.
Site: Dry, sun.
Fruit: Achene.

A small shrub. Considered a valuable winter forage for livestock.

Grayia polygaloides, see *Grayia spinosa.*

Grayia spinosa (Hook.) Moq. **Spiny hop-sage.**
G. polygaloides Hook. and Arn., *Chenopodium spinosum* Hook.
Range: 7, 8, 9, 10, 12, 13.
Site: Dry, well-drained, moist, sun.
Fruit: Achene, available July–August.

A small, much-branched, spinose, stiff, monoecious or dioecious shrub; flowers April–May; may occur on alkaline soil.

Observations: Somewhat eaten in dry seasons by Oregon jack rabbit. Browsed by livestock and considered good forage for sheep and cattle.

Grossularia amara, see *Ribes amarum.*

Grossularia binominata, see *Ribes binominatum.*

Grossularia californica, see *Ribes californicum.*

Grossularia cognata, see *Ribes cognatum.*

Grossularia curvata, see *Ribes curvatum.*

Grossularia cynosbatii, see *Ribes cynosbatii.*

Grossularia divaricata, see *Ribes divaricatum.*

Grossularia hesperia, see *Ribes hesperium.*

Grossularia hirtella, see *Ribes hirtellum.*

Grossularia inermis, see *Ribes inerme.*

Grossularia irrigua, see *Ribes irriguum.*

Grossularia lasianthum, see *Ribes leptanthum.*

Grossularia leptantha, see *Ribes leptanthum.*

Grossularia lobbii, see *Ribes lobbii.*

Grossularia marshallii, see *Ribes marshallii.*

Grossularia menziesii, see *Ribes menziesii.*

Grossularia missouriensis, see *Ribes missouriense.*

Grossularia nivea, see *Ribes niveum.*

Grossularia oxyacanthoides, see *Ribes oxyacanthoides.*

Grossularia parishii, see *Ribes divaricatum.*

Grossularia pinetorum, see *Ribes pinetorum.*

Grossularia quercetorum, see *Ribes quercetorum.*

Grossularia roezlii, see *Ribes roezlii.*

Grossularia rotundifolia, see *Ribes rotundifolium.*

Grossularia sericea, see *Ribes sericeum.*

Grossularia setosa, see *Ribes setosum.*

Grossularia speciosa, see *Ribes speciosum.*

Grossularia velutina, see *Ribes velutinum.*

Grossularia victoris, see *Ribes victoris.*

Grossularia watsoniana, see *Ribes watsonianum.*

Guiacum angustifolium, see *Porlieria augustifolia.*

Gutierrezia linearis Rydb. **Turpentine weed.**
Range: 15, 16.
Site: Dry, sun.
Fruit: Achene.
A small shrub; flowers July–September.

Gutierrezia longifolia Greene. **Turpentine weed.**
Range: 9, 11, 13, 14, 16.
Site: Dry, sun.
Fruit: Achene.
A small shrub; flowers in August.

Gyminda grisebachii, see *Gyminda latifolia.*

Gyminda latifolia Sw. **False boxwood.**
G. grisebachii Sarg.
Range: 17, 32.
Site: Well-drained, sun.
Fruit: Drupe.
A large shrub to small tree; evergreen.

Gymnocladus dioica (L.) Koch. **Kentucky coffeetree.**
Range: 19, 21, 22, 23, 24, 25, 27.
Site: Well-drained, sun.
Fruit: Legume; available in September, persistent unopened through the winter.

A large tree; ordinarily occurs in rich soil; flowers May–June; root system deep, widespreading; root nodules not formed; wind-firm; wood very durable, used to some extent commercially; rarely attacked by insects or disease. Seed germination high but irregular and slow, vitality high; 200–300 seeds per pound. Leaves poisonous to cattle, but cases of poisoning are infrequent, often happening when pods fall into drinking pools.

Gymnolomia tenuifolia, see *Viguiera stenoloba.*

Halesia spp.
Observations (in addition to specific records): Gray squirrel.

Halesia carolina L. **Silverbell.**
H. tetraptera L., *Mohrodendron carolinum* Britt.
Range: 25, 27, 28, 29, 30.
Site: Well-drained, sun, shade.
Fruit: Winged capsule.
A large shrub to small or large tree; flowers March–April; rarely attacked by insect pests; easily storm-damaged; very ornamental and much cultivated; propagation is by seed stratified and sown in spring or sown as soon as ripe.

Halesia diptera Ell. **Two-wing silverbell.**
Mohrodendron dipterum Britt.
Range: 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Winged capsule.
A small to large tree; flowers March–April; propagation as above.

Halesia monticola (Rehd.) Sarg. Mountain silverbell.
Range: 27, 29.
Site: Well-drained, sun.
Fruit: Winged capsule.

A large tree; flowers in May; rapid growing in cultivation; more vigorous and upright than *H. carolina.*

Halesia parviflora Michx. Little silverbell.
Mohrodendron parviflorum Britt.
Range: 29, 30.
Site: Well-drained, sun, shade.
Fruit: Winged capsule, available August–September.

A small to large tree; flowers March–April. Possibly only a variety of *H. carolina.* Propagation as above.

Halesia tetraptera, see *Halesia carolina.*

Halliophytum hallii (Brandeg.) Johnst.
Tetracoccus hallii Brandeg., *Securingea fasciculata hallii* (Brand.) Jeps.
Range: 10.
Site: Dry, sun.
Fruit: Capsule.

A small to large, dioecious, spreading shrub; flowers April–May; spinescent; leaves fascicled; intricately branched but scarcely bushy.

Hamamelis macrophylla Pursh. Southern witch hazel.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Capsule, available September–November.

A small to large tree; flowers December–February; produces stoloniferous shoots around the trunk; propagation is by seed stratified and sown in spring or as soon as ripe.

Hamamelis vernalis Sarg. Little witch hazel.
Range: 25, 29.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small to large shrub; occurs only on gravel; flowers January–March; thicket forming by means of stolons.

Observations: White-tailed deer.

Hamamelis virginiana L. Witch hazel.
Range: 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Capsule, available August–December.

A large shrub to small or large tree; occurs in sandy and other soils; flowers August–December; free from insects and disease; slow growing; thicket forming; will withstand city smoke; propagation is by seed stratified and sown in spring or as soon as ripe; seeds ordinarily take 2 years to germinate.

Stomach records: Ruffed grouse, bobwhite, ring-necked pheasant; white-tailed deer. *Observations:* Ring-necked pheasant; cottontail rabbit, beaver, white-tailed deer.

Havardia brevifolia, see *Pithecolobium brevifolium.*

Havardia pallens, see *Pithecolobium brevifolium.*

Hazardia cana, see *Aplopappus canus.*

Hazardia detonsa, see *Aplopappus canus.*

Hazardia serrata, see *Aplopappus canus.*

Hazardia squarrosus, see *Aplopappus squarrosus.*

Hedeoma incana, see *Poliomintha incana.*

Helianthus cernuus, see *Flourensia cernua.*

Helietta parvifolia (Gray) Benth. Baretta
Ptelea parvifolia Gray.
Range: 17.
Site: Dry, well-drained, sun.
Fruit: Samara, available in October.

A large shrub to small or large tree; evergreen; thicket forming; flowers April–May; occurs on limestone and other soils.

Heliomeris tenuifolia, see *Viguiera stenoloba.*

Herpothamnus crassifolius, see *Vaccinium crassifolium.*

Hesperodoria scopulorum, see *Aplopappus scopulorum.*

Hesperopeuce mertensiana, see *Tsuga mertensiana.*

Heteromeles arbutifolia, see *Photinia arbutifolia.*

Heteromeles salicifolia, see *Photinia arbutifolia.*

Heyderia decurrens, see *Libocedrus decurrens.*

Hicoria alba, see *Carya alba.*

Hicoria aquatica, see *Carya aquatica.*

Hicoria buckleyi, see *Carya buckleyi.*

Hicoria carolinae-septentrionalis, see *Carya carolinae-septentrionalis.*

Hicoria cordiformis, see *Carya cordiformis.*

Hicoria fernowiana, see *Carya myristicaeformis.*

Hicoria floridana, see *Carya floridana.*

Hicoria glabra, see *Carya glabra.*

Hicoria laciniosa, see *Carya laciniosa.*

Hicoria leiodermis, see *Carya leiodermis.*

Hicoria microcarpa, see *Carya microcarpa.*

Hicoria minima, see *Carya cordiformis.*

Hicoria myristicaeformis, see *Carya myristicaeformis.*

Hicoria ovalis, see *Carya ovalis.*

Hicoria ovata, see *Carya ovata.*

Hicoria pallida, see *Carya pallida.*

Hicoria pecan, see *Carya pecan.*

Hicoria sulcata, see *Carya laciniosa.*

Hicoria texana, see *Carya texana.*

Hicoria villosa, see *Carya villosa.*

Hoffmanseggia microphylla Torr.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small to large shrub; flowers in April; stems rushlike, forming a broad, rounded bush; commonly occurs in sandy soils.

Holacantha emoryi Gray. Crucifixion thorn.
Range: 10, 11.
Site: Dry, sun.
Fruit; Nutlike drupe.

A large dioecious, thorny, rigid, much-branched, nearly leafless shrub; fruiting clusters very dense.

Holodiscus spp.

Propagation of all species is by seed sown in the fall.

Observations (in addition to specific records): Relished by Olympic wapiti.

Holodiscus discolor (Pursh) Maxim. Oceanspray.
Spiraea discolor Pursh, *Sericotheca discolor* (Pursh) Rydb. *Schizonotus discolor* (Pursh) Raf.
Range: 1, 2, 4, 5, 12.
Site: Dry, well-drained, sun.
Fruit: Follicle.

A large bushy shrub; flowers May–July; often pioneers in burned-over areas.

Var. *microphyllus* (Rydb.) Jeps. (*H. microphyllus* Rydb., *Sericotheca microphylla* Rydb.), occurring in regions 4, 12, and 13, is a dwarf form.

Var. *glabrescens* (Heller) Jeps. (*H. glabrescens* Heller, *Sericotheca glabrescens* (Greenm.) Rydb., *S. obovata* Rydb.), occurring in regions 4, 12, and 13, is a more spreading type.
Observations: Black-tailed deer. Of minor importance as browse for livestock.

Holodiscus dumosus (Nutt.) Heller.
Sericotheca dumosa (Nutt.) Rydb., *Spiraea dumosa* Nutt.
Range: 9, 10, 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Follicle.
A small to large, compact shrub; often forms large clumps.
Observations: Yosemite cony.

Holodiscus glabrescens, see *Holodiscus discolor.*

Holodiscus microphyllus, see *Holodiscus discolor.*

Holodiscus schaffneri (Rydb.) Standl.
Sericotheca schaffneri Rydb.
Range: 9, 11.
Site: Dry, sun.
Fruit: Follicle.
A small shrub.

Hopea tinctoria, see *Symplocos tinctoria.*

Horsfordia alata (Wats.) Gray.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Dry carpel.
A large shrub; flowers April–December.

Horsfordia newberryi (Wats.) Gray. Newberry falsemallow.
Abutilon newberryi Wats.
Range: 10.
Site: Dry, sun.
Fruit: Dry carpel.
A small to large shrub with virgate branches; flowers April–May. Apparently not palatable to livestock.

Hosackia balsamifera, see *Lotus stipularis.*

Hosackia macrophylla, see *Lotus stipularis.*

Hosackia stipularis, see *Lotus stipularis.*

Houstonia fasciculata Gray.
Range: 11, 17.
Site: Dry, sun.
Fruit: Capsule.
A small, spreading shrub.

Hudsonia ericoides L. Gold-heather.
Range: 26, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small, bushy evergreen shrub, often occurs on sandy or rocky soil; flowers in May; occurs mainly along the coast.

Hudsonia montana Nutt.
Range: 27.
Site: Dry, sun.
Fruit: Capsule.
A small, bushy evergreen shrub; very local in occurrence but probably once more widely distributed.

Hudsonia tomentosa Nutt. Beach-heather.
Range: 23, 24, 26, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small evergreen shrub; flowers May–July; occurs in sand; intricately branched and matted.

Hugeria erythrocarpa (Michx.) Small.
Vaccinium erythrocarpum Michx., *Oxycoccus erythrocarpus* (Michx.) Pers.
Range: 27.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available August–October.

A small to large shrub; flowers June–July; ordinarily occurs in acid soil.

Hydrangea arborescens L. **Wild hydrangea.**
Range: 22, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, shade.
Fruit: Capsule, available October–December.

A small to large, somewhat straggling shrub; flowers June–July and sometimes again in September; propagation is by seed stratified and sown in spring.

Observations: Wild turkey; white-tailed deer. Reputed poisonous to livestock.

Hydrangea cinerea Small. **Ashy hydrangea.**
Range: 25, 27.
Site: Well-drained, shade.
Fruit: Capsule, available September–November.

A small to large shrub; flowers June–July.

Hydrangea quercifolia Bartr. **Oakleaf hydrangea.**
Range: 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule.

A small to large spreading shrub; flowers in June.

Hydrangea radiata Walt. **Silver-leaf hydrangea.**
Range: 27, 28.
Site: Dry, well-drained, moist, shade.
Fruit: Capsule.

A small to large shrub; flowers June–July.

Hymenoclea monogyra Torr. and Gray **Burrobrush.**
Range: 5, 10, 11.
Site: Dry, well-drained, moist, sun.
Fruit: Achene.

A small to large shrub; occurs in sandy and other soils; thicket forming; rapid growing; aggressive; leafier than *H. salsola.* Little browsed by livestock.

Hymenoclea pentalepis Rydb.
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small to large shrub; very similar to *H. monogyra.*

Hymenoclea salsola Torr. and Gray **White burrobrush.**
Range: 9, 10.
Site: Dry, well-drained, moist, sun.
Fruit: Achene.

A small, spreading shrub; occurs on sandy and alkaline soils.

Hypericum spp.

Stomach records (in addition to specific records): Eleven species of birds, including bobwhite, ruffed grouse, and ring-necked pheasant, but nearly all species in this country are herbaceous and the records of utilization by wildlife may apply mostly to them.

Hypericum microsepalum, see *Crookea microsepala.*

Hypericum prolificum L. **Shrubby St. Johnswort.**
Range: 22, 23, 24, 25, 27, 28, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Achene, available September–October.

A small shrub; flowers July–September; occurs on sandy and other calcareous soils; foliage dense; free from insects and diseases; commonly occurs on eroded slopes; propagation is by seed or cuttings.

Hyptis emoryi Torr. **Desert lavender.**
Range: 10, 11.
Site: Dry, sun.
Fruit: Nutlet.

A small to large, compact shrub.

Observations: Much visited by hummingbirds. Considered a fair to fairly good livestock browse.

Ilex spp.

Stomach records (in addition to specific records): Thirty-two species of birds including ruffed grouse, bobwhite and wild turkey; white-tailed deer.
Observations: Nine species of birds.

Ilex ambigua, see *Ilex montana.*

Ilex beadlei, see *Ilex montana.*

Ilex bronxensis, see *Ilex verticillata.*

Ilex caroliniana, see *Ilex montana.*

Ilex cassine L. Dahoon holly.
I. dahoon Walt., *I. myrtifolia* Walt.
Range: 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available September–March.

A large shrub to small tree or rarely a large tree; evergreen; flowers in May; occurs on sandy and often acid soils.

Stomach records: Six species of birds; raccoon. *Observations:* Fish crow, red-eyed vireo.

Ilex coriacea (Pursh) Chapm. Tall inkberry.
I. lucida Torr. and Gray, *Prinos coriacea* Pursh.
Range: 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Berry, available September–October.

A small to large shrub, or rarely a small to large tree; evergreen; flowers April–May.

Ilex dahoon, see *Ilex cassine.*

Ilex decidua Walt. Deciduous holly.
Range: 16, 17, 20, 25, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available September–March.

A large shrub to small or large tree; flowers April–May.
Stomach records: Nine species of birds, including bobwhite.

Ilex dubia, see *Ilex montana.*

Ilex glabra (L.) Gray. Gallberry.
Range: 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available July–June.

A small evergreen shrub; occurs on sandy and other soils; free from insects and diseases; will sprout after fire.

Stomach records: Fifteen species of birds, including bobwhite and wild turkey. *Observations:* Mockingbird, hermit thrush; capitive marsh rabbit. An important honey plant.

Ilex laevigata (Pursh) Gray. Smooth winterberry.
Range: 26, 27, 28, 29.
Site: Moist, sun.
Fruit, Berry, available September–January.

A small to large shrub or rarely a large tree; flowers May–June; often occurs on acid soil.

Ilex longipes Chapm. (pl. 16, *A*). Largeleaf holly.
Range: 20, 27, 28, 29, 30.
Site: Dry, sun.
Fruit: Berry, available September–October.

A small to large shrub or small tree; branches widespreading, but not dense.

Ilex lucida, see *Ilex coriacea.*

Ilex montana Torr. and Gray. Mountain holly.
I. monticola, *I. caroliniana* (Walt.) Trel., not mill. Gray, *I. ambigua* (Michx.) Chapm., *I. beadlei* Ashe, *I. dubia* B. S. P.
Range: 25, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available October–November.

A small to large shrub or small to large tree; flowers in May; 1,375 berries per pound; germination of seed about 50 percent.

Stomach records: White-tailed deer.

Ilex monticola, see *Ilex montana.*

Ilex myrtifolia, see *Ilex cassine.*

Ilex opaca Ait. (pl. 16, *B*). **American holly.**

Range: 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available August–June.

A small to large evergreen tree; occurs on sandy, loam, gravel, clay, and other soils; flowers April–June; taproot deep and well developed, especially with age; easy to transplant when young; slow growing, somewhat long-lived; free from insects and diseases; wood of importance commercially; fruits 5 to 8 years after planting; embryo of seed rudimentary, good germination obtained when seeds are treated with a normal solution of potassium hydroxide for 5 minutes, then a normal solution of hydrochloric acid, washed and sown, and watered as needed with a 5-percent solution of glucose; 31,000 seeds per pound, germination 20 percent, about 1,000 usable plants per pound of seed.

The berries are borne on pistillate trees or occasionally on trees which may be monoecious. In growing hollies from seed, the proportion of pistillate to staminate trees produced is about 1 to 10. The plants ordinarily flower from 5 to 12 years after planting, but until then the two kinds of plants cannot be distinguished. Wild seedlings ordinarily are not satisfactory for transplanting because of the extensive root system developed at an early age. Seed germination extends at the very least over 1 year, and nothing is to be gained by fall planting since seeds sown in spring germinate just as quickly as if sown 6 months earlier. Propagation by cuttings results in forms true to type. All staminate forms should not be destroyed since pollination is necessary for the formation of the fruit.

Stomach records: Eighteen species of birds, including bobwhite and wild turkey; white-tailed deer. *Observations:* Refused by captive marsh rabbit.

Ilex verticillata (L.) Gray. **Winterberry.**

Range: 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry; available September–October, persistent or not.

A small to large shrub or rarely a small tree; flowers June–July; free from insects and diseases; easily transplanted; 2,000 berries per pound. Several minor varieties have been described.

Var. *tenuifolia* Wats., (*I. bronxensis* Britt.) has solitary fruit and occurs in the northeastern part of the species range.

Stomach records: Sixteen species of birds, including ruffed grouse, bobwhite, and sharp-tailed grouse. *Observations:* Ten species of birds, including ring-necked pheasant.

Ilex vomitoria Ait. (pl. 16, *C*). **Yaupon.**

Range: 20, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Berry; available September–October, persistent or not.

A large evergreen shrub; occurs in sandy and other soils; flowers in May.

Stomach records: Seven species of birds, including bobwhite.

Illicium floridanum Ell.

Range: 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupelike.

A large evergreen shrub. Reputed to be poisonous to livestock.

Illicoides mucronata, see *Nemopanthus mucronata.*

Indigofera sphaerocarpa Gray.

Range: 10.
Site: Dry, sun.
Fruit: Legume.

A small shrub.

Ingenhouzia triloba, see *Thurberia triloba.*

Inodes texana, see *Sabal texana.*

Ioxylon pomiferum, see *Maclura pomifera.*

Isocoma acradenius, see *Aplopappus acradenius.*

Isocoma scopulorum, see *Aplopappus scopulorum.*

Isomeris arborea Nutt. **Bladderpod.**
Range: 5, 10.
Site: Dry, sun.
Fruit: Capsule.
A small shrub; flowers February–May; usually occurs on alkaline soils; sometimes herbaceous.

Itea virginica L. **Sweetspire.**
Range: 25, 28, 29.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.
A large shrub; flowers May–June; usually occurs along the Coast; propagation is by seed sown under glass in spring.

Jamesia americana Torr. and Gray. **Cliffbush.**
J. americana californica Jeps., *Edwinia americana* (Torr. and Gray) Heller, *E. californica* Small.
Range: 4, 10, 11, 12, 13, 14.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.
A small shrub; flowers May–July; commonly occurs on stream banks; in cultivation.

Janusia gracilis Gray.
Range: 10, 11, 16, 17.
Site: Dry, sun.
Fruit: Samara.
A vine.

Jatropha cardiophylla (Torr.) Muell.
Range: 10.
Site: Dry, sun.
Fruit: Capsule.
A small shrub.

Jatropha carthaginensis, see *Manihot carthaginensis.*

Jatropha multifida L.
Range: 17.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A large shrub to small tree.

Jatropha spathulata (Orteg.) Muell. **Sangre de drago.**
Mozinna spathulata Orteg.
Range: 11.
Site: Dry, Well-drained, sun.
Fruit: Capsule.
A small to large shrub; stems flexible and tough.

Juglans spp. **Walnuts.**
Most species are commonly attacked by fungi and insects but none is very seriously damaged.

Stomach records (in addition to specific records): Four species of birds; Arizona gray squirrel, walnut rock squirrel. *Observations:* Two species of birds.

Juglans californica Wats. **California walnut.**
Range: 3, 5, 10.
Site: Well-drained, moist, sun.
Fruit: Nut.
A large shrub; resistant to walnut yellows; 30 seeds per pound.
Observations: California mule deer.

Juglans cinerea L. **Butternut.**
Range: 18, 19, 21, 22, 23, 24, 25, 26, 27, 28.
Site: Well-drained, sun.
Fruit: Nut, available September–November.

A large monoecious tree; root system deep with a deep taproot, but rather widespreading; rapid growing, especially when young; short lived; foliage much injured by defoliating insects; very susceptible to fire damage; wind-firm, but easily storm damaged; ordinarily occurs on rich soils but will grow on somewhat poorer and drier soils than *J. nigra;* wood somewhat used commercially; heartwood durable; propagation is by seed stratified in the fall and sown in spring; 16–40 seeds per pound, germination 80 percent; somewhat difficult to transplant; sugar may be produced from this species as in sugar maple.

Observations: White-tailed deer, cottontail rabbit, red squirrel, and other squirrels.

Juglans glabra, see *Carya glabra.*

Juglans hindsii Jeps. **Hinds walnut.**
J. californica hindsii Jeps.
Range: 1, 3, 4.
Site: Well-drained, sun.
Fruit: Nut.

A large tree; not resistant to walnut yellows; 30 seeds per pound.

Juglans major (Torr.) Heller. **Arizona walnut.**
J. rupestris major Torr.
Range: 11, 16, 17.
Site: Well-drained, sun.
Fruit: Nut.

A small or large shrub to large tree; taproot much developed, especially in early stages; at first rapid growing, later slower; long-lived; wood very durable in contact with soil; fruit borne abundantly every 2 or 3 years; 45 seeds per pound, germination 30–50 percent; occurs in many kinds of soil.

Observations: Much eaten by squirrels and other rodents.

Juglans myristicaeformis, see *Carya myristicaeformis.*

Juglans nigra L. **Black walnut.**
Range: 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, sun, shade.
Fruit: Nut, available October–November.

A large monoecious tree; root system deep, widespreading; will not grow on dry or poor soils; rapid growing, especially when young; long-lived; wind-firm; fire resistant; foliage much attacked by caterpillars; wood injured by borers; generally free from fungus attacks; wood of great commercial value, very durable; begins bearing at 10 to 15 years of age; propagation is by seeds stratified and sown in spring; about 25 seeds per pound, germination 90–95 percent; much cultivated.

Observations: White-tailed deer, red squirrel, and other squirrels. Not palatable to cattle.

Juglans ovata, see *Carya ovata.*

Juglans rupestris Engelm. **Texas walnut.**
J. whippleana Torr.
Range: 11, 14, 16, 17, 19, 20, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Nut.

A small to large shrub to small or rarely a large tree; seedlings with a deep-growing taproot, fairly rapid growing; occurs commonly on limestone soils; may often form thickets; often branched to the base; fruit generally borne in abundance every 2 or 3 years; 75 seeds per pound. What was formerly considered merely a western form of this species is here treated as *J. major*, although it is often given only varietal rank and intermediate forms exist.

Observations: Rock squirrel; favorite food of Huachuca squirrel.

Juglans whippleana, see *Juglans rupestris.*

Juniperus spp. **Junipers.**

Evergreen, commonly dioecious, or rarely monoecious trees or shrubs; fruit a berrylike cone maturing in 1 to 3 seasons. Some forms are of value commercially but all species are important because of their ability to grow on dry, barren slopes and exposed situations. Nearly all junipers are slow growing; propagation is by seed stratified at 32°–50° F., 30–60 days before planting in spring. Most are secondary hosts for the cedar apple rust.

Stomach records (in addition to specific records) : Twenty-six species of birds, including bobwhite, ruffed grouse, and sharp-tailed grouse; armadillo, gray fox, Gila chipmunk, black-tailed deer, plains white-tailed deer. *Observations* (in addition to specific records: Twenty-four species of birds, including Merriam's turkey, Mearn's quail, northern, prairie, and Columbian sharp-tailed grouse; coyote, Oregon gray fox, cliff chipmunk, opossum, rock squirrel, Arizona gray fox, Texas plains coyote, San Juan coyote; much eaten by New Mexico black bear, Say chipmunk, Utah chipmunk, Couch rock squirrel; berries a staple food of mule deer; an emergency browse of mule deer.

Juniperus ashei, see *Juniperus mexicana*.

Juniperus barbadensis, see *Juniperus lucayana*.

Juniperus californica Carr. **California juniper.**
Range: 1, 3, 4, 10.
Site: Dry, sun.
Fruit: Berry, available all year round.

A large shrub.

Observations: California mule deer.

Juniperus communis L. **Dwarf juniper.**
Range: 1, 4, 8, 9, 11, 12, 13, 14, 15, 18, 19, 21, 22, 23, 24, 25, 26, 27.
Site: Dry, well-drained, moist, sun.
Fruit: Berry; available September; persistent all year round.

A small to large shrub, or even a small tree, very rarely a large tree; evergreen; occurs on sandy and other soils; usually monoecious, rarely dioecious; thrives on almost any soils; very slow growing; long-lived; wood exceptionally durable, not used commercially; fruit maturing the third year, persistent 1 to 2 years after maturity, of some importance commercially; 17,000–30,000 seeds per pound.

Var. *depressa* Pursh., occurring in the northeastern United States, rarely exceeds 3–4 feet in height. Var. *montana* Ait. (*J. sibirica* Burgsd.), is of more general distribution; a high mountain form usually less than 3 feet in height. Var. *jackii* Rehd. is a prostrate western form. A fourth form is known in the high mountains of Japan.

Stomach records: Nine species of birds, including ruffed grouse, bobwhite, sharp-tailed grouse, Hungarian partridge, and ring-necked pheasant; this and *J. horizontalis* composed 1.6 percent of winter food of northern sharp-tailed grouse in Quebec and Ontario. *Observations:* Twenty-two species of birds, including bobwhite and Hungarian partridge; many small mammals; white-tailed deer, moose.

Juniperus erythrocarpa Cory. **Red-fruited juniper.**
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Berry, available in December.

A small evergreen tree.

Juniperus flaccida Schlecht. **Drooping juniper.**
Sabina flaccida (Schlecht.) Lewis.
Range: 11, 17.
Site: Dry, well-drained.
Fruit: Berry; mature in September of the second season; long persistent.

A small to large, dioecious, evergreen tree; occurs on sandy and other soils; slow growing, long-lived; wood very durable, somewhat used locally.

Juniperus gymnocarpa (Lemmon) Cory.
J. occidentalis gymnocarpa Lemmon.
Range: 11, 13, 14, 16.
Site: Dry, sun.
Fruit: Berry, available August–December.

A large evergreen tree.

Juniperus horizontalis Moench. (pl. 17, *A*).
Range: 12, 15, 18, 21, 23, 24, 26, 27.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available all year round.

A small evergreen shrub; occurs on sandy and other soils; forms dense mats. *Stomach records:* Sharp-tailed grouse; this and *J. communis* composed 1.6 percent of winter food of northern sharp-tailed grouse in Quebec and Ontario. *Observations:* Sparingly browsed by moose, northern white-tailed deer.

Juniperus knightii, see *Juniperus utahensis.*

Juniperus lucayana Britt. **Southern red cedar.**
J. barbadensis L., *Sabina barbadensis* (L.) Small.
Range: 29, 30.
Site: Moist, sun, shade.
Fruit: Berry, available all year round.

A small to large, usually dioecious, evergreen tree; root system shallow; slow growing, long-lived; wood very durable, much used commercially; in cultivation.

Juniperus megalocarpa Sudw. **Big-berry juniper.**
J. utahensis megalocarpa Sudw.
Range: 9, 11, 14.
Site: Dry, well-drained, sun.
Fruit: Berry, ripe September–October of the second season.

A large, dioecious, evergreen tree; occurs in sandy, loam, gravel, and other soils; slow growing, long-lived.

Juniperus mexicana Spreng. **Mountain cedar.**
J. sabinoides (H. B. K.) Nees, *Sabina sabinoides* Small.
Range: 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Berry, available September of the first season.

A small to large evergreen tree; occurs on sandy and other poor soils, often limestone; wood very durable, much used locally.

J. ashei Buch., occurring along the White River in the Ozarks, in northwestern Arkansas, and southwestern Missouri, as well as in the Arbuckle Mountains of Oklahoma, has been said to be the same species as *J. mexicana.* There still seems to be considerable doubt whether the two are synonymous. The large break in the distribution of the two forms and the fact that *J. ashei* has been little studied make it impossible to state with definiteness whether the two forms are distinct or not.

Both forms are claimed to be resistant to the cedar apple rust; both fork near the base, thus possessing several boles. The fruits of *J. ashei* are much fleshier and twice as large as *J. virginiana. J. ashei* was in the fall of 1936 found to be much eaten by many songbirds, more notably robins. These birds succeeded in stripping almost the entire crop of seeds produced by these species throughout the Ozarks.

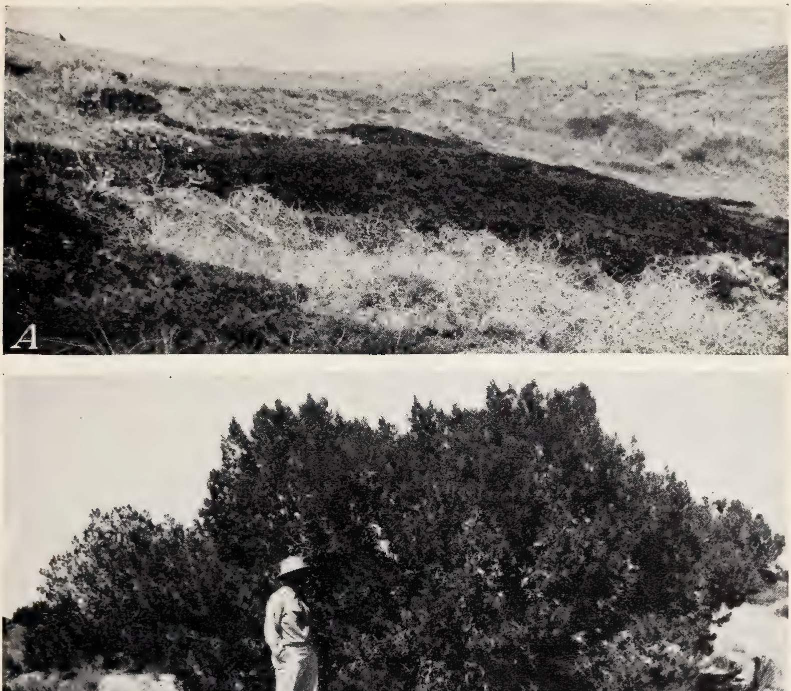
Juniperus monosperma (Engelm.) Sarg. (pl. 17, *B*, *C*). **Cherrystone juniper.**
J. mexicana monosperma Cory, *J. occidentalis monosperma* Engelm., *Sabina monosperma* (Engelm.) Rydb.
Range: 8, 9, 11, 13, 14, 16, 25.
Site: Dry, well-drained, sun.
Fruit: Berry; available in September; persistent all year.

A large shrub to small tree; evergreen; dioecious, rapid growing for a juniper, long-lived; wood of value and much used locally for posts and fuel; usually several trunked.

Stomach records: Four species of birds. *Observations:* Four species of songbirds, Gambel quail; coyote, fox, raccoon, rock squirrel; extensively eaten by Hopi chipmunk; deer. Browsed to some extent by goats.

Juniperus occidentalis Hook. (pl. 18, *A*). **Western juniper.**
Sabina occidentalis (Hook) Ant.
Range: 3, 4, 5, 6, 7, 8, 12.
Site: Dry well-drained, sun.
Fruit: Berry; available September of the second season; persistent all year round.

A small to large, dioecious, evergreen tree; slow growing and very long-lived; apparently unable to exist in close formation; grows on extremely sterile granite or gravels; regenerative powers remarkable.



A, *Juniperus horizontalis*. Like other junipers, this species can grow on very difficult sites, but develops slowly. The mat-forming habit enhances its value as soil cover. *B*, *J. monosperma*. As with other southwestern junipers, this form provides excellent cover for soil and wildlife and an important food for birds and mammals. *C*, *J. monosperma*. The cherrystone juniper, besides itself producing valuable wildlife food, often serves as host to a mistletoe that bears a berry very attractive to small birds.

A. Juniperus occidentalis. The fruit of the western juniper is very similar in appearance to that of many others. The berries of all species appear to be much utilized by wildlife, although specific records are often lacking. *B, J. scopulorum.* Dense foliage and the ability to thrive in poor soils are valuable erosion-control characters common to most junipers. The fruits of all junipers are relished by many mammals as well as by a host of birds. (Photograph by Department of the Interior.)

Observations: Pinyon jay, Townsend solitaire; of slight importance as browse for mule deer.

Juniperus pachyphloea Torr. **Alligator juniper.**
J. mexicana pachyphloea Torr., *Sabina pachyphloea* (Torr.) Lewis.
Range: 11, 14, 17.
Site: Dry, well-drained, sun.
Fruit: Berry, available September-December.

A small to large, dioecious, evergreen tree; seasoned wood durable, used locally; slow growing, long-lived; fruit matures slowly and remains in good condition either on or off the tree for a considerable period.

Observations: Wild turkey; New Mexico black bear, Couch rock squirrel; extensively eaten by gray fox; deer; considered of first importance as food for big game in New Mexico. Eaten by all classes of livestock.

Juniperus pinchotii Sudw. **Red-berry juniper.**
Sabina pinchotii (Sudw.) Lewis.
Range: 11, 16, 20.
Site: Dry, well-drained, sun.
Fruit: Berry, available all year round.

A large shrub to small or large tree; evergreen; coppices freely when cut; wood durable but soft; very local.

Juniperus sabinoides, see *Juniperus mexicana*.

Juniperus scopulorum Sarg. (pl. 18, *B*). **Rocky Mountain red cedar.**
Sabina scopulorum (Sarg.) Lewis.
Range: 2, 6, 7, 9, 11, 12, 13, 14, 15, 16.
Site: Dry, well-drained, sun.
Fruit: Berry; ripening the second season, available all year round.

A large shrub to small or large tree; evergreen; dioecious, slow growing, long-lived; 20,000–30,000 seeds per pound.

Stomach records: Townsend's solitaire; bighorn.

Juniperus sibirica, see *Juniperus communis*.

Juniperus utahensis (Engelm.) Lemmon. **Utah juniper.**
J. californica utahensis Engelm., *J. knightii* Nels., *Sabina utahensis* (Engelm.) Rydb.
Range: 8, 9, 10, 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Berry; available in September, persistent all year.

A small to large, evergreen tree; 6,000–7,000 seeds per pound.

Stomach records: Avocet; Utah cliff chipmunk, black-tailed deer. *Observations:* Deer. Eaten to some extent by goats.

Juniperus virginiana L. **Eastern red cedar.**
Sabina virginiana (L.) Antoine.
Range: 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Berry; available September–November, persistent all year round.

A large evergreen tree; at first deep rooted, but root system becomes more shallow with age; thrives in many kinds of soil, including limestone, dolomitic, and rarely granitic and siliceous soils; slow growing and long-lived; easily killed by fire; attacked by fungi; wood very durable, much used commercially; 18,000–30,000 seeds per pound, germination ordinarily 35–70 percent; from berries frozen in ice 21 days, seeds germinate in 35 days to 56 percent; resists grazing well; very drought resistant; notable secondary host to cedar apple rust; some 30 varieties distinguished in cultivation.

Stomach records: Twenty-nine species of birds including bobwhite; oppossum.

Observations: Fifty-two species of birds including bobwhite, prairie sharp-tailed grouse, ring-necked pheasant, and mourning dove; cottontail rabbit, moose.

Kalmia sp.
Observations (in addition to specific records): Ruffed grouse.

Kalmia angustifolia L. **Narrow-leaved laurel.**
Range: 24, 26, 27, 28, 29.
Site. Well-drained, moist, sun, shade.
Fruit: Capsule.

A small evergreen shrub; usually occurs on acid soil; flowers June–July.

Stomach records: Ruffed grouse. Poisonous to sheep and cattle.

Kalmia carolina Small. **Wicky.**
Range: 27, 28, 29.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.

A small evergreen shrub; flowers June–July; occurs on acid soil.

Kalmia cuneata Michx. **White wicky.**
Range: 29, 30.
Site: Moist, sun.
Fruit: Capsule.

A small evergreen shrub; flowers April–May; occurs in acid swamps.

Kalmia glauca, see *Kalmia polifolia.*

Kalmia hirsuta Walt. **Wicky.**
Kalmiella hirsuta (Walt.) Small.
Range: 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.

A small evergreen shrub; flowers May–August; occurs in sandy and other acid soils.

Kalmia latifolia L. (pl. 19). **Mountain-laurel.**
Range: 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Capsule, available in September.

Usually a small to large shrub, more rarely a small tree, or very uncommonly a large tree; evergreen; occurs in sandy and other acid soils; free from insects and diseases; many cultivated forms are known; neither the species nor the varieties thrive on clay or limestone soils:

Stomach records: Ruffed grouse; white-tailed deer. *Observations:* Ruffed grouse; an important winter food of white-tailed deer but toxic to them if taken in great quantities to the exclusion of other foods. Leaves poison sheep and cattle, which avoid it unless other forage is poor. Fatalities from honey made from this plant are on record.

Kalmia microphylla (Hook.) Heller.
K. glauca microphylla Hook.
Range: 4, 12, 13.
Site: Well-drained, sun.
Fruit. Capsule.

A small evergreen shrub; flowers June–August.

Kalmia polifolia Wang. **Pale-laurel.**
K. glauca Ait.
Range: 4, 12, 23, 24, 26, 27.
Site: Moist, sun, shade.
Fruit: Capsule.

A small, straggling, evergreen shrub; flowers May–July; usually occurs on acid soils. Very poisonous to livestock.

Kalmiella hirsuta, see *Kalmia hirsuta.*

Karwinskia spp.

Stomach records (in addition to specific records): Antelope jack rabbit (?), gray-sided jack rabbit (?).

Karwinskia glandulosa, see *Karwinskia humboldtiana.*

Karwinskia humboldtiana (Roem. and Schult.) Zucc. **Coyotillo.**
K. parvifolia Rose, *K. glandulosa* Zucc., *Rhamnus humboldtiana* Roem. and Schult., *R. maculata* Sesse.
Range: 11, 16, 17.
Site: Dry, sun.
Fruit: Berry; available in October, commonly persistent.

A small to large shrub; easily transplanted by root divisions. Seeds of this species are highly toxic to all domestic animals as well as children; leaves only slightly so; the flesh of the berry is apparently not as poisonous.

Karwinskia parvifolia, see *Karwinskia humboldtiana.*

Koeberlinia spinosa Zucc. Allthorn.
Range: 11, 16, 17.
Site: Dry, sun.
Fruit: Berry, available in September.

A small to large shrub, or rarely, a small to large tree; much branched, almost leafless; flowers May–June; extremely spiny; difficult to transplant; thicket forming.

Observations: Scaled quail, jack rabbit.

Krameria spp.
Observations (in addition to specific records): Mountain sheep.

Krameria canescens, see *Krameria grayi.*

Krameria glandulosa (MacBr.) Rose and Paint. Range ratany.
K. parvifolia glandulosa MacBr.
Range: 10, 11, 16.
Site: Dry, sun.
Fruit: Pod.

A small, much-branched, somewhat trailing shrub; flowers July–August and October–November; occurs in the hottest and driest parts of gravelly mesas; seed abundantly produced. A valuable forage for stock; grazing assists in spreading the burlike fruits.

Krameria grayi Rose and Paint. Chacate.
K. canescens Gray, not Willd.
Range: 10, 11, 17.
Site: Dry, sun.
Fruit: Pod.

A small, thorny, spreading shrub; densely and intricately branched; occurs on sandy and rocky soils; parasitic on roots of various associated woody plants.

Krameria parvifolia Benth. Pima ratany.
Range: 10, 11, 17.
Site: Dry, sun.
Fruit: Pod.

A small, rigid, often spinose shrub; parasitic on the roots of *Parkinsonia microphylla.*

Krameria ramosissima (Gray) Wats.
K. parvifolia ramosissima Gray.
Range: 11, 17.
Site: Sun.
Fruit: Pod.

A small, spiny, rigid, much-branched shrub; flowers April–May.

Kraunhia frutescens, see *Wisteria frutescens.*

Kraunhia macrostachya, see *Wisteria macrostachya.*

Kunzia glandulosa, see *Purshia glandulosa.*

Kunzia tridentata, see *Purshia tridentata.*

Lantana aculeata, see *Lantana camara.*

Lantana camara L. Lantana.
L. aculeata L.
Range: 10, 17, 20, 29, 30.
Site: Well-drained, sun.
Fruit: Drupe, available August–September.

A small to large, thorny shrub; occurs only on sandy soils; resistant to drought; apparently long-lived; the Arizona locality appears to be one where the plant was introduced not by man but by birds; very showy, much cultivated.

Considered poisonous to sheep and cattle but shunned by them.

Lantana involucrata L. White-flowered lantana.
L. velutina Mart. and Gal., *L. odorata berlandieri* Torr.
Range: 17, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe.

A small to large, much-branched shrub with willowlike stems; occurs in sandy and other soils.

Lantana lippioides, see *Lippia geminata.*

Lantana macropoda Torr.
Range: 11, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Drupe.
A small shrub.

Lantana velutina, see *Lantana involucrata.*

Larix spp. **Larches.**

Dioecious, deciduous trees, nine of which are known, three occurring in North America; propagation is by seed sown in spring.

Stomach records (in addition to specific records): Three species of birds, including ruffed grouse; plains white-tailed deer. *Observations* (in addition to specific records): Five species of birds, including Franklin grouse; Olympic black bear; rarely cut for building material, not food, by beaver.

Larix americana, see *Larix laricina.*

Larix laricina (Du Roi) Koch. **Tamarack.**
L. americana Michx.
Range: 22, 23, 24, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Cone; mature the autumn of the first season, seeds shed during fall and winter, cones persistent 1 or 2 years longer.

A large tree; root system shallow and spreading on wet sites, deeper on drier sites; rapid growing until 35 to 45 years old, then slower on ordinary sites, or on poor sites generally slow growing; intolerant of shade; not fire resistant; susceptible to the attacks of the larch sawfly; very old trees produce less seed and irregularly; 90,000 seeds per pound; wood hard, of importance commercially; quite intolerant of drier soils.

Stomach records: Four species of birds, including ruffed grouse and northern sharp-tailed grouse. *Observations:* Eight species of birds, including spruce grouse, northern sharp-tailed grouse, emergency food of prairie sharp-tailed grouse; snowshoe hare, porcupine, red squirrel; casually browsed by northern white-tailed deer.

Larix lyallii Parl. **Alpine larch.**
Range: 4, 12.
Site: Dry, well-drained, sun.
Fruit: Cone; ripens in August of the first season; seeds shed at once, cones soon falling.

A large, long-lived tree; wood hard, tough, heavy, somewhat used commercially.

Stomach records: Plains white-tailed deer.

Larix occidentalis Nutt. **Western larch.**
Range: 4, 12.
Site: Dry, well-drained, moist, sun.
Fruit: Cone; mature in August–September of the first season; seeds soon shed, cones soon falling.

A large tree; rapid growing only in juvenile stages; long-lived; grows best in well-drained soils; intolerant of shade, especially on dry soils; resistant to fire after the pole stage; generally free from insects and diseases; wood very heavy, very durable, and of value commercially; prolific seeder in good years, but sterile periods often occur for 1 or 2 seasons; has not been successful as an ornamental in the East; 100,000–150,000 seeds per pound, germination 19–30 percent.

Stomach records: Plains white-tailed deer.

Larrea, see *Covillea.*

Lasiococcus dumosus, see *Gaylussacia dumosa.*

Lasiococcus mosieri, see *Gaylussacia dumosa.*

Laurocerasus caroliniana, see *Prunus caroliniana.*

Laurus albida, see *Sassafras albidum.*

Lauris geniculata, see *Glabraria geniculata.*

Lavatera assurgentiflora Kellogg. **Californea treemallow.**
Sanviniona assurgentiflora Greene.
Range: 5.
Site: Well-drained, sun.
Fruit: Dry carpel.

A large shrub; has been much used in windbreak plantings; from seed reaches 6 feet in height, and blooms the first year.

Ledum buxifolium, see *Leiophyllum buxifolium.*

Ledum columbianum Piper.
Range: 1.
Site: Moist, sun.
Fruit: Capsule.

A small evergreen shrub; flowers in June; common in acid bogs.

Ledum glandulosum Nutt. **Smooth Labrador-tea.**
Range: 4, 12, 13.
Site: Moist, sun.
Fruit: Capsule, available August–September.

A small to large evergreen shrub; flowers May–June; common in acid bogs. *Observations:* Mountain beaver. Only slightly toxic to livestock.

Ledum groenlandicum Oeder. **Labrador-tea.**
Range: 4, 12, 23, 24, 26, 27.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule, available in August.

A small evergreen shrub; flowers May–June; common in acid bogs. *Stomach records:* Sharp-tailed grouse; composed 1.8 percent of winter food of northern sharp-tailed grouse in Ontario and Quebec. Poisonous to cattle, although a high-ranking summer food for reindeer. *Observations:* Casually browsed by northern white-tailed deer.

Leiophyllum buxifolium (Berg.) Ell. **Box sandmyrtle.**
Ledum buxifolium Berg., *Dendrium buxifolium* (Berg.) Desv.
Range: 28, 29, 30.
Site: Well-drained, sun, shade.
Fruit: Capsule.

A small, widely-branched evergreen shrub; flowers May–June; occurs on sand.

Leiophyllum hugeri (Small) Sch.
Dendrium hugeri Small.
Range: 27, 28.
Site: Well-drained, sun.
Fruit: Capsule.

A small, much-branched evergreen shrub.

Leiophyllum lyonii Sweet.
Dendrium lyonii (Sweet) Small.
Range: 27.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small, copiously-branched evergreen shrub; usually decumbent and with matted branches.

Leitneria floridana Chapm. **Corkwood.**
Range: 20, 25, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Leathery drupe, available May–September.

A small shrub to small tree; flowers March–April; spreads by suckers; does well only on peaty soils; wood lighter than cork.

Lepargyrea argentea, see *Shepherdia argentea.*

Lepargyrea canadensis, see *Shepherdia canadensis.*

Lepargyrea rotundifolia, see *Shepherdia rotundifolia.*

Lepidanthus phyllanthoides, see *Andrachne phyllanthoides.*

Lepisdospartum latisquamum Wats. **Broadscale broom.**
L. striatum Cov.
Range: 10.
Site: Dry, sun.
Fruit: Achene.
A large shrub.

Lepidospartum squamatum Gray. **Scalebroom.**
Linosyris squamata Gray, *Tetradymia squamata* Gray.
Range: 5, 10.
Site: Dry, sun.
Fruit: Achene.
A small to large, rigid, broomlike shrub.

Lepidospartum striatum, see *Lepidospartum latisquamum.*

Leucaena greggii Wats. **Gregg's lead tree.**
Ryncholeucaena greggii (Wats.) Britt. and Rose.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Legume.
A large shrub to small tree.

Leucaena pulverulenta (Schlecht.) Benth. **Mexican lead tree.**
Acacia pulverulenta Schlecht.
Range: 11, 17.
Site: Well-drained, sun.
Fruit: Legume.
A large tree or becoming a shrub northward; wood occasionally used locally, less commonly commercially; a rich soil species.

Leucaena retusa Benth.
Caudoleucaena retusa (Benth.) Britt. and Rose.
Range: 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Legume, available in August.
A large shrub to small tree or rarely a large tree; flowers April–October; occurs on limestone and other soils. A favorite browse of cattle.

Leucophyllum frutescens (Berl.) Johnst. **Cenizo.**
L. texanum Benth.
Range: 11, 17, 20.
Site: Dry, sun.
Fruit: Capsule.
A small to large shrub; in cultivation.

Leucophyllum minor Gray.
Range: 11, 17.
Site: Dry, sun.
Fruit: Capsule.
A small, almost prostrate shrub.

Leucophyllum texanum, see *Leucophyllum frutescens.*

Leucothoë acuminata (Ait.) Don.
Andromeda acuminata Ait.
Range: 29, 30.
Site: Moist, sun.
Fruit: Capsule.
A small to large evergreen shrub, occurs on acid soils.

Leucothoë axillaris (Lam.) Don.
Andromeda axillaris Lam.
Range: 29, 30.
Site: Moist, sun, shade.
Fruit: Capsule.
A small to large evergreen shrub; flowers February–April; occurs in acid soils.

Leucothoë catesbaei (Walt.) Gray.
Andromeda catesbaei Walt.
Range: 27, 28.
Site: Well-drained, moist, shade.
Fruit: Capsule.

A small to large evergreen shrub; flowers in April; branches long, spreading or recurved; occurs on acid soils; used commercially.

Leucothoë davisiae Torr. **Blacklaurel.**
Oreocallis davisiae (Torr.) Small.
Range: 1, 4.
Site: Moist, sun, shade.
Fruit: Capsule.

A small evergreen shrub; flowers in June; occurs on acid soils. 1 to 2 ounces of leaves will kill a sheep.

Leucothoë elongata Small.
Eubotrys elongata Small.
Range: 29, 30.
Site: Moist, sun.
Fruit: Capsule.

A large shrub; occurs in acid swamps.

Leucothoë racemosa (L.) Gray.
Eubotrys racemosa (L.) Nutt., *Andromeda racemosa L.*
Range: 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.

A small to large, widely-branching shrub; flowers May–June; occurs in acid swamps. Poisonous to livestock, especially calves.

Leucothoë recurva (Buckl.) Gray.
Eubotrys recurva (Buckl.) Britt., *Andromeda recurva* Buckl.
Range: 27.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule.

A small to large shrub; flowers April–May; occurs in acid soils.

Libocedrus decurrens Torr. **Incense cedar.**
Heyderia decurrens (Torr.) Koch.
Range: 1, 4, 5.
Site: Dry, well-drained, sun, shade.
Fruit: Cone; ripening August–September, seeds soon shed, cones persistent.

A large, evergreen, usually dioecious, rarely monoecious tree; root system compact, without a taproot; grows on any soil but adobe and boulder wash; high humidity is not essential for its growth; slow growing, long-lived; windfirm; somewhat susceptible to diseases and mistletoe; wood of great importance commercially, very durable; abundant seed crop produced every 3 years; 11,000–17,000 seeds per pound; germination 20–40 percent; ornamental and in cultivation.

Observations: Of fair importance as browse for mule deer; mountain beaver.

Ligustrum spp. **Privets.**

In addition to the species listed below, *L. sinense* Lour., the Chinese privet, and *L. lucidum*, the glossy privet, are sometimes spontaneous about towns in the South. Several species, notably those following, have been used successfully in erosion control in the Piedmont, Atlantic, and Gulf Coastal Plains.

Observations (in addition to specific records): Fourteen species of birds, including bobwhite.

Ligustrum ovalifolium Hassk. **California privet.**
Range: 29, 30.
Site: Dry, well-drained, sun.
Fruit: Berry, available in September, persistent.

A large shrub to small tree; nearly evergreen southward; a native of Japan but more or less naturalized in the regions indicated; much cultivated.

Ligustrum vulgare L. **Privet.**
Range: 26, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Berry, available in September, long persistent.

A large shrub, nearly evergreen southward; introduced from Eurasia but more or less naturalized in the regions indicated; not hardy in North Dakota; 13,000 seeds per pound.

Stomach records: Robin. *Observations:* Ring-necked pheasant in southern Michigan.

Linnaea borealis L. **Twinflower.**
Linnaea borealis americana Rehd.
Range: 1, 2, 4, 12, 13, 14, 23, 24, 26, 27.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Capsule.

A prostrate, evergreen vine; flowers June–August; often forms a good ground cover.

Stomach records: Ruffed grouse, plains white-tailed deer. Possibly poisonous to livestock.

Linosyris depressa, see *Chrysothamnus depressus.*

Linosyris parryi, see *Chrysothamnus parryi.*

Linosyris pulchella, see *Chrysothamnus pulchellus.*

Linosyris squamata, see *Lepidospartum squamatum.*

Linosyris teretifolia, see *Chrysothamnus teretifolius.*

Lippia berlandieri Schauer. **Redbush.**
Range: 17.
Site: Well-drained, sun.
Fruit: Nutlet.

A small shrub; root system shallow; easily transplanted.

Lippia geminata H. B. K.
L. lantanoides Coult., *Lantana lippioides* Hook.
Range: 17.
Site: Well-drained, sun.
Fruit: Nutlet.

A small shrub.

Lippia lantanoides, see *Lippia geminata.*

Lippia ligustrina Britt. **Whitebrush.**
L. lycioides Steud., *Aloysia ligustrina* (Lag.) Small.
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Nutlet.

A large, sometimes spinescent shrub; easily grown from seed, and easily transplanted. Palatable to livestock, and a good honey plant.

Lippia lycioides, see *Lippia ligustrina.*

Lippia wrightii Gray.
Range: 9, 10, 11, 14.
Site: Dry, well-drained, sun.
Fruit: Nutlet.

A small to large shrub; generally grows among rocks; under 3,000 feet elevation grows only on northern slopes; from 3,000 to 5,000 feet grows at any aspect; but over 6,000 feet it is limited to southern exposures.

Fair to fairly good local browse for livestock. A good honey plant.

Liquidambar styraciflua L. **Sweetgum**
Range: 20, 22, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Compound capsule, available September–November; seeds shed during the winter.

A large tree; ordinarily occurs on better soils but able to grow on very poor ones; flowers April–May; very rapid growing, rather long-lived; seriously injured by fire; free from insects and diseases; coppices freely; wood of importance commercially; about 128,000 seeds per pound, germination 50–75 percent; somewhat difficult to transplant; very ornamental and in cultivation.

Stomach records: Twelve species of birds, including bobwhite and wild turkey. *Observations:* Thirteen species of birds, including bobwhite; ranks sixteenth in the list of quail food plants of the southeast; captive marsh rabbits, eastern chipmunk, gray squirrel.

Liriodendron tulipifera L. **Tuliptree.**
Range: 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Samara, available September–November.

A large tree; occurs on a variety of soils; flowers May–June; root system deep, wide spreading; not easily transplanted when young; rapid growing when young, later slower; comparatively long-lived; seriously injured by fire; free from insects and diseases; coppices freely; wood durable, of importance commercially; a pioneer in gullies, often forming thickets in rapidly gullying ravines; 12,000–14,000 seeds per pound, germination 2–12 percent, slow.

Stomach records: Four species of birds, including bobwhite; white-tailed deer. *Observations:* Three species of birds; cottontail rabbit, white-tailed deer, red squirrel.

Lithocarpus densiflora (Hook. and Arn.) Rehd. **Tan oak.**
Pasania densiflora Orst., *Quercus densiflora* Hook. and Arn.
Range: 1, 4.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Nut, mature at the end of the second season.

A large evergreen tree; slow growing; free from insects and fungi; windfirm; much damaged by fire; stump sprouts abundantly after injury; very aggressive; of great importance commercially for tannage; second season after the bark is stripped a heavy crop of acorns is produced, the tree then dies.

Var. *echinoides* Jeps. is a shrubbier form in region 4.

Observations: Redwood chipmunk; of slight importance as browse for mule deer. Usually avoided by livestock.

Litsea geniculata, see *Glabraria geniculata.*

Lonicera spp. **Honeysuckles.**

Stomach records (in addition to specific records): Fourteen species of birds, including bobwhite, Gambel quail, sharp-tailed grouse, and ring-necked pheasant; Mono chipmunk, Coeur d'Alene chipmunk, buff-bellied chipmunk. *Observations* (in addition to specific records): Six species of birds; moose. Most species are generally unpalatable to stock, although sometimes browsed.

Lonicera albiflora Torr. and Gray.
L. dumosa Gray.
Range: 11, 14, 16, 17, 20.
Site: Well-drained, moist, sun.
Fruit: Berry, available October–November.

A small to large, bushy shrub, or occasionally somewhat climbing.

Lonicera altissima, see *Lonicera oblongifolia.*

Lonicera arizonica Rehd. **Arizona honeysuckle.**
Range: 11, 14.
Site: Well-drained, sun.
Fruit: Berry.

A vine.

Lonicera caerulea, see *Lonicera cauriana* and *L. villosa.*

Lonicera canadensis Marsh. **American fly-honeysuckle.**
L. ciliata Muhl., *Xylosteon ciliatum* (Muhl.) Pursh.
Range: 23, 24, 26, 27.
Site: Moist, shade.
Fruit: Berry, available June–September.

A small, straggling shrub; flowers April–May.

Observations: White-tailed deer.

Lonicera caprifolium L. **Sweet honeysuckle**
Range: 22, 24, 25, 27, 28, 29.
Site: Well-drained, sun.
Fruit: Berry, available August–September.

A twining vine, or occasionally somewhat shrubby; introduced from Europe but more or less established in regions indicated; flowers May–June.

Lonicera cauriana Fernald. **Mountain fly-honeysuckle.**
L. caerulea of auths., not L.
Range: 4, 12, 13.
Site: Well-drained, moist, sun.
Fruit: Berry, available June–July.
A small shrub; flowers April–May.

Lonicera ciliata, see *Lonicera canadensis.*

Lonicera ciliosa Poir. **Honeysuckle.**
Range: 4, 12, 13, 14.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available July–September.
A twining or procumbent vine; flowers in June.
Stomach records: Catbird.

Lonicera conjugialis Kellogg.
Xylosteon conjugiale Howell.
Range: 1, 4.
Site: Dry, well-drained, sun.
Fruit: Berry, available August–September.
A small, much-branched shrub; flowers in June.
Stomach records: Sooty grouse. *Observations:* Blue grouse.

Lonicera dioica L. **Mountain honeysuckle.**
Range: 23, 24, 25, 27.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available June–October.
A diffuse or twining vine; flowers May–June; attacked by green aphis.

Lonicera dumosa, see *Lonicera albiflora.*

Lonicera ebractulata, see *Lonicera utahensis.*

Lonicera flava Sims. **Yellow honeysuckle.**
Range: 25, 27, 28, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available August–September.
A slightly twining vine; flowers April–May.

Lonicera flavida Cockerell.
Range: 25.
Site: Dry, well-drained, sun.
Fruit: Berry.
A trailing or climbing vine.

Lonicera glaucescens Rydb. **Douglas honeysuckle.**
L. dioica glaucescens (Rydb.) Butters, *L. hirsuta glaucescens* Rydb.
Range: 18, 21, 22, 23, 24, 25, 26, 27.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available August–September.
A twining vine; very similar to *L. hirsuta;* intergrades with *L. dioica.*

Lonicera hirsuta Eaton. **Hairy honeysuckle.**
Range: 23, 24, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Berry, available July–October.
A high-climbing vine; flowers June–July.
Stomach records: Two species of birds.

Lonicera hispidula Dougl. **Pink honeysuckle.**
Range: 2, 3, 4, 5.
Site: Dry, well-drained, sun.
Fruit: Berry, available July–February.
A climbing vine; evergreen; flowers July–August; several varieties have been described. Of some importance as a honey plant.

Lonicera interrupta Benth. **Chaparral honeysuckle.**
Range: 4, 10, 11, 14.
Site: Dry, sun.
Fruit: Berry, available June–December.
A bushy vine or small shrub; evergreen.

Observations: Wren-tit; of slight importance as browse for mule deer. Not browsed by stock; reported by stockmen as poisonous. Of some importance as a honey plant.

Lonicera involucrata (Richards) Banks. **Twinberry honeysuckle.**
Xylosteon involucrata Richards, *Distegia involucrata* (Richards.) Raf., *L. ledebouri* Esch.
Range: 4, 5, 7, 12, 13, 14, 23, 24, 26.
Site: Well-drained, moist, shade.
Fruit: Berry, available August–September.

A large bushy shrub; flowers June–July; suckers very freely and may form patches of considerable size; root system fibrous, shallow, rootstocks also shallow; 226,000 seeds per pound.

Stomach records: Four species of birds. *Observations:* Blue grouse, flowers much used by blue-throated and Rivoli hummingbirds. Only locally browsed by livestock.

Lonicera japonica Thunb. **Japanese honeysuckle.**
Nintooa japonica Sweet.
Range: 5, 20, 22, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available September–March.

A half-evergreen vine; flowers June–August; introduced from eastern Asia and well established in regions indicated; extremely aggressive in competition with native plants; known to have killed trees up 6 inches in diameter; not necessarily confined to richer, moister woodlands, where it does best; often considered a troublesome weed, especially in the South; gradually becoming more widespread; many cultivated varieties known, of which var. *halliana* is most widely naturalized.

Stomach records: Five species of birds, including bobwhite.

Lonicera ledebouri, see *Lonicera involucrata.*

Lonicera oblongifolia (Goldie) Hook. **Swamp fly-honeysuckle.**
L. altissima Jennings, *Xylosteon oblongifolia* Goldie.
Range: 23, 24, 26, 27.
Site: Moist, sun.
Fruit: Berry, available May–August.

A small to large, somewhat straggling shrub; flowers May–June.

Lonicera prolifera (Booth) Rehd. **Grape honeysuckle.**
L. sullivantii Gray, *Caprifolium proliferum* Booth.
Range: 22, 23, 24, 25.
Site: Dry, well-drained, sun.
Fruit: Berry, available July–October.

A vine; flowers May–June; very similar to *L. dioica;* attacked by green aphis.

Lonicera sempervirens L. **Trumpet honeysuckle.**
Phenianthus sempervirens (L.) Raf.
Range: 11, 20, 22, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Berry, available September–October.

A high-climbing vine; evergreen; flowers April–September; leaves deciduous northward; in cultivation.

Observations: Purple finch.

Lonicera subspicata Hook. and Arn. **Moronel.**
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Berry.

A climbing or trailing vine or small to large shrub; evergreen.

Observations: California mule deer.

Lonicera sullivantii, see *Lonicera prolifera.*

Lonicera utahensis Wats. **Utah honeysuckle.**
L. ebractulata Rydb. *Xylosteon utahense* (Wats.) Howell.
Range: 4, 12, 13, 14.
Site: Dry, well-drained, shade.
Fruit: Berry, available June–August.

A small to large shrub; forms clumps. Locally of some value as browse for livestock.

Lonicera villosa (Michx.) Roem. and Schult. **Mountain fly-honeysuckle.**
L. caerulea of auths., not L., *Xylosteon villosum* Michx.
Range: 23, 24, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Berry, available in July.

A small, much-branched shrub with ascending branches; generally free from insects and diseases; may occur on limestone, peat, and other soils.

Lotus stipularis (Benth.) Greene.
Hosackia stipularis Benth., *H. macrophylla* Kellogg, *H. balsamifera* Kellogg.
Range: 1, 4.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small shrub; flowers April–July.

Lupinus spp. **Lupines.**

These species are claimed to harbor the bean weavil in California.

Stomach records (in addition to specific records): Richardson's grouse; mountain sheep, black-tailed deer. *Observations:* Clark's nutcracker. These records apply to herbaceous species also.

Lupinus albifrons Benth. **Silver lupine.**
Range: 4, 5.
Site: Well-drained, sun.
Fruit: Legume.

A small to large shrub or small tree; evergreen; flowers March–July; occurs on sandy or dry loam; often gregarious; several varieties known.

Lupinus arboreus Sims. **Tree lupine.**
L. propinquus Greene.
Range: 1, 5.
Site: Well-drained, sun.
Fruit: Legume.

A small to large evergreen shrub; occurs in sandy soil; flowers April–June; has been introduced into New Zealand, where it is considered valuable as a cover for shifting sand, being used extensively in dune reclamation; it is not a sand-binder, but should be used where there is a well-controlled area to the windward; pod-bearing branches laid on bare dunes will prevent the movement of sand, and seeds later germinate to form a cover.

Lupinus austromontanus, see *Lupinus excubitus.*

Lupinus breweri Gray. **Mat lupine.**
Range: 4, 10.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small evergreen shrub; flowers June–July; ordinarily occurs in rocky soil; forms dense, prostrate mats; season's growth 1 to 6 inches; several varieties with less seasonal growth are known.

Lupinus chamissonis Esch. **Dune lupine.**
Range: 1, 5.
Site: Well-drained, sun.
Fruit: Legume, available August–September.

A small evergreen shrub; flowers May–June; occurs in sandy soil; the species occurs on the most exposed areas in wind-swept blow-outs and often on the crest of sand dunes; withstands the severest winds, and becomes established where sand is not moving; root system extensive.

Lupinus excubitus Jones. **Guard lupine.**
Range: 4, 5, 10.
Site: Well-drained, sun.
Fruit: Legume, available August–September.

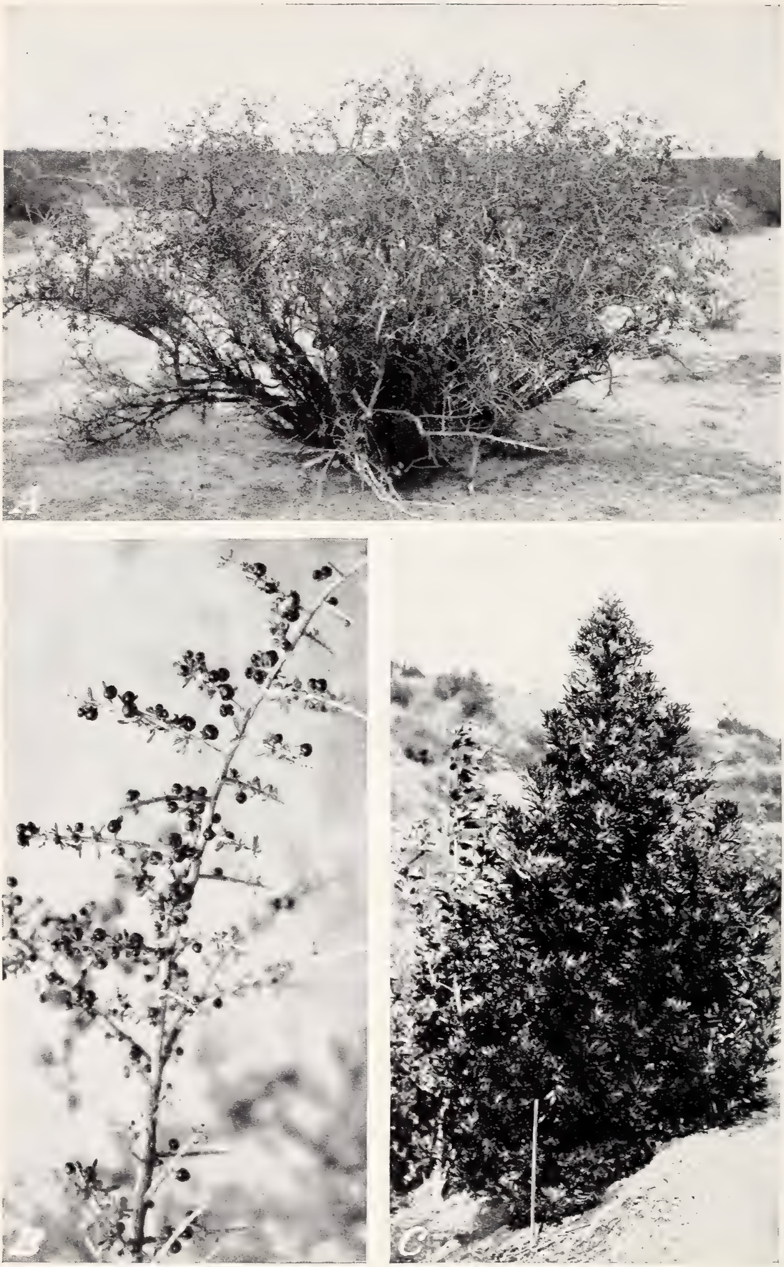
A small evergreen shrub; occurs on gravelly and other soils; flowers May–June.

Var. *hallii* Sm. (*L. hallii* Abrams, *L. paynei* Dav.), is larger and coarser. Var. *johnstonii* Sm., is a lower, subalpine form of dry mountain tops. Var. *austromontanus* Sm. (*L. austromontanus* Heller), is a herbaceous form.

Lupinus hallii, see *Lupinus excubitus.*

Lupinus paynei, see *Lupinus excubitus.*

Kalmia latifolia. An ornamental species of the first rank, the mountain-laurel has proved its value in roadside plantings where soil conditions permit. Its evergreen, dense foliage provides good soil cover. (Photograph by U. S. Forest Service.)



A, *Lycium andersonii*. The desert-thorns as a group show much promise for erosion control and wildlife plantings in the Southwest. *B*, *L. andersonii*. The fruits of most species of *Lycium* are probably utilized by wildlife much more than available records indicate. *C*, *Lyonothamnus floribundus*. A young specimen of the Catalina ironwood growing in a California garden. Although as yet not commonly planted, this native tree of bushy habit and rapid growth, when supplied with adequate water, may prove valuable.

Lupinus propinquus, see *Lupinus arboreus.*

Lycium spp.
The root systems of the species are relatively extensive in comparison with the aerial portions, often extending 25–30 feet from the plants; roots tough and fibrous; propagation is by seed sown as soon as ripe or by cuttings.

Stomach records (in addition to specific records): Three species of birds, including Gambel and scaled quail. *Observations* (in addition to specific records): Verdin, Gila woodpecker; Mexican raccoon; important food for birds and desert rodents generally.

Lycium andersonii Gray. (pl. 20, *A*, *B*). **Anderson desert-thorn.**
Range: 5, 8, 9, 10, 11, 14.
Site: Dry, sun.
Fruit: Berry, available April–May.

A small, spiny, scraggly shrub; flowers April–June; profusely branched; tolerant of alkali; occurs in sandy and other soils.

Stomach records: Gambel quail. *Observations:* Attractive to black-chinned hummingbird.

Lycium berlandieri Dunal.
Range: 10, 11, 14, 16, 17, 20.
Site: Dry, sun.
Fruit: Berry.

A small to large shrub; occurs in sandy and other soils.

Forma *parviflorum* (Gray) Hitchc., (*L. parviflorum* Gray) is more robust with numerous leaves and is generally found in the northwestern part of the range.

Lycium californicum Nutt. **California desert-thorn.**
Range: 5, 10, 11.
Site: Well-drained, moist, sun.
Fruit: Berry, available April–October.

A small, densely-branched shrub; occurs on clay or sand; decumbent or spreading; spiny, and branches much intertwined.

Lycium carolinianum Walt. **Christmasberry.**
Range: 17, 20, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Berry.

A small, trailing or somewhat climbing, spiny shrub; occurs on saline or alkaline soil, sand or limestone.

Var. *quadrifidum* (Moc. and Sesse) Hitchc., (*L. quadrifidum* Moc. and Sesse), the large-fruited matrimony vine, is more widely distributed and spinier than the species, commoner westward; grows in sand; drought resistant; will grow in standing water; fruit attractive to waterfowl.

Lycium cooperi Gray. **Cooper desert-thorn.**
Range: 9, 10.
Site: Dry, sun.
Fruit: Berry.

A small to large, compact shrub; flowers April–June; occurs in sandy and other soils; stout, spiny and densely branched.

Lycium exsertum Gray.
L. fremontii bigelovii Gray.
Range: 11.
Site: Dry, sun.
Fruit: Berry.

A small to large, sparingly-branched, few-spined, rigid shrub; rapid growing; nearly evergreen; procumbent branches root; roots well from cuttings; seed produced abundantly.

Lycium fremontii Gray. **Fremont desert-thorn.**
L. pallidum fremontii Terac., *L. gracilipes* Gray.
Range: 5, 10, 11.
Site: Dry, sun.
Fruit: Berry.

A small to large, freely-branched, somewhat spiny shrub; usually occurs in rather alkaline soil. Browsed by livestock in winter.

Lycium gracilipes, see *Lycium fremontii.*

Lycium halimifolium Mill. **Matrimony-vine.**
L. vulgare (Ait.) Dunal.
Range: 2, 4, 9, 13, 14, 15, 16, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available August–May.

A vine or small to large shrub; sparingly branched, spreading to recumbent; spiny or unarmed; introduced and more or less naturalized from Europe in the regions indicated; in the west sometimes considered a weed.

Lycium hassei, see *Lycium richii.*

Lycium macrodon Gray.
Range: 10, 11.
Site: Dry, sun.
Fruit: Berry, available March–May.

A small to large, much-branched, spreading, spiny shrub; flowers in February.

Lycium pallidum Miers. **Pale desert-thorn.**
Range: 9, 10, 11, 13, 14.
Site: Dry, sun.
Fruit: Berry, available July–August.

A small to large, widespreading, thorny shrub; flowers April–May; occurs in sandy and other soils; sprouts readily when cut or broken down; often forms thickets.

Locally important and valuable as browse for livestock, especially on winter range.

Lycium palmeri, see *Lycium richii.*

Lycium parishii Gray. **Parish desert-thorn.**
Range: 10.
Site: Dry, sun.
Fruit: Berry.

A small to large, much-branched, short-spined, rigid shrub.

Lycium parviflorum, see *Lycium berlandieri.*

Lycium pringlei, see *Lycium richii.*

Lycium puberulum Gray.
Range: 11, 17.
Site: Dry, sun.
Fruit: Berry, available in June.

A small, spiny, sparingly branched shrub.

Lycium quadrifidum, see *Lycium carolinianum.*

Lycium richii Gray.
L. palmeri Gray, *L. pringlei* Gray.
Range: 5, 10.
Site: Dry, sun.
Fruit: Berry.

A small to large, spiny shrub; erect or somewhat clambering; much branched; sometimes forms dense thickets; tolerant of saline conditions; drought resistant; tolerant of poor soil.

Var. *hassei* (Greene) Johnst., (*L. hassei* Greene) occurs in region 5 and is almost unarmed. The species called *L. verrucosum* Eastw. of the San Nicholas Islands is considered a freak originating from this species. It grows in eroded arroyos.

Lycium spencerae, see *Prunus fasciculata.*

Lycium torreyi Gray. **Squaw desert-thorn.**
Range: 9, 10, 11, 16, 17.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available June–September.

A small to large thorny shrub; flowers March–June; much branched and spreading; with heavy spines or unarmed.

Lycium verrucosum, see *Lycium richii.*

Lycium vulgare, see *Lycium halimifolium.*

Lymnobtrya lacustris, see *Ribes lacustre.*

Lymnobotrya montigena, see *Ribes montigena.*

Lymnobotrya parvula, see *Ribes lacustre.*

Lyonia ferruginea, see *Xolisma fruticosa.*

Lyonia frondosa, see *Xolisma ligustrina.*

Lyonia ligustrina, see *Xolisma ligustrina.*

Lyonia mariana, see *Xolisma mariana.*

Lyonida nitida, see *Xolisma lucida.*

Lyonia rigida, see *Xolisma ferruginea.*

Lyonothamnus asplenifolius, see *Lyonothamnus floribundus.*

Lyonothamnus floribundus Gray. (pl. 20, *C*). **Catalina ironwood.**
L. asplenifolius Greene.
Range: 5.
Site: Dry well-drained, sun.
Fruit: Capsule, available August–September.

A small to large evergreen tree; flowers June–July; rapid growing, especially when well supplied with water; bushy; drought resistant; very ornamental and commonly cultivated.

Maclura aurantiacum, see *Maclura pomifera.*

Maclura pomifera (Raf.) Schneid. **Osage-orange.**
M. aurantiacum Nutt., *Toxylon pomiferum* Raf., *Ioxylon pomiferum* Raf.
Range: 20, 22, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Syncarp, available in October.

A large, dioecious, much-branched, thorny tree; wood very strong and durable; much cultivated as a hedge plant and extensively planted throughout the country for that purpose; a host for the San Jose scale; not hardy in northern Iowa, Minnesota, and the Dakotas; a thorny variety is known in cultivation; propagation is by seed sown in spring after soaking 48 hours; about 12,000 seeds per pound.

Stomach records: Black-tailed deer. *Observations:* Crossbill; fox squirrel; particularly valuable cover plant for small forms of wildlife.

Macrosiphonia berlandieri, see *Macrosiphonia macrosiphon.*

Macrosiphonia macrosiphon (Torr.) Heller.
M. berlandieri Gray, *Echites macrosiphon* Torr.
Range: 11, 17.
Site: Dry, sun.
Fruit: Pod.

A small shrub.

Magnolia spp. **Magnolias.**

Most species are generally free from insects and diseases; most grow in acid soil; propagation is by seed stratified and sown in spring or sown at once; usually difficult to transplant.

Stomach records (in addition to specific records): Five species of birds, including bobwhite.

Magnolia acuminata L. **Cucumber magnolia.**
Tulipastrum acuminatum (L.) Small.
Range: 22, 24, 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available August–October.

A large tree; flowers May–June; occurs on fertile, not heavy soils, nor dry sand or shale; root system deep, wide spreading, taproot rarely developed; rapid growing, rather short-lived; severely injured by fire and cucumber scale; coppices freely; wood soft, weak, durable, used to some extent commercially; often used as grafting stock for named varieties; propagation is by seed stratified at 32° F., 15 to 20 weeks, and sown in spring; about 3,000 seeds per pound; easy to transplant.

Magnolia ashei Weath. **Ashe magnolia.**
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Drupe, available September–October.
A large shrub to large tree; occurs in sandy and other soils.

Magnolia cordata Michx. **Yellow-flower magnolia.**
M. acuminata cordata Sarg., *Tulipastrum cordatum* Small.
Range: 27, 28, 29.
Site: Well-drained, sun.
Fruit: Drupe, available September–October.
A large shrub; or in cultivation, becoming a large tree.

Magnolia foetida, see *Magnolia grandiflora.*

Magnolia fraseri Walt. **Mountain magnolia.**
Range: 27, 28.
Site: Well-drained, moist, sun.
Fruit: Drupe, available September–October.
A large tree; flowers May–June.

Magnolia glauca, see *Magnolia virginiana.*

Magnolia grandiflora L. (pl. 21, *A*). **Evergreen magnolia.**
M. foetida (L.) Sarg.
Range: 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available August–October.
A large evergreen tree; flowers April–August; wood weak, not durable, somewhat used commercially; about 2,000 seeds per pound; easily transplanted, much cultivated.
Stomach records: Five species of birds. *Observations:* Five species of birds, including wild turkey; gray squirrel, captive marsh rabbit.

Magnolia macrophylla Michx. **Bigleaf magnolia.**
Range: 25, 27, 28, 29, 30.
Site: Well-drained, moist, shade.
Fruit: Drupe, available September–October.
A large tree; flowers May–June; leaves much wind-damaged; young trees will coppice.

Magnolia pyramidata Pursh. **Pyramid magnolia.**
Range: 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe, available September–October.
A small to large tree; flowers in June.

Magnolia tripetala L. **Umbrella magnolia.**
M. umbrella L.
Range, 25, 27, 28, 29.
Site: Well-drained, moist, sun.
Fruit: Drupe, available September–October.
A large, rapid-growing tree; flowers May–June.

Magnolia umbrella, see *Magnolia tripetala.*

Magnolia virginiana L. **Sweetbay.**
M. glauca L.
Range: 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe, available September–October.
A large shrub to small or large tree; evergreen; flowers May–June; generally occurs near the coast in the southern part of its range; often thicket forming; consistently found on mediacid soil; cultivated to some extent.

Mahonia aquifolium, see *Berberis aquifolium.*

Mahonia fascicularis, see *Berberis pinnata.*

Mahonia fremontii, see *Berberis fremontii.*

Mahonia haematocarpa, see *Berberis haematocarpa.*

Mahonia nervosa, see *Berberis nervosa.*

Mahonia nevinii, see *Berberis nevinii.*

Mahonia pinnata, see *Berberis pinnata.*

Mahonia pumila, see *Berberis pumila.*

Mahonia repens, see *Berberis repens.*

Mahonia swaseyi, see *Berberis swaseyi.*

Mahonia trifoliolata, see *Berberis trifoliolata.*

Malache lasiopetala, see *Pavonia lasiopetala.*

Malachodendron pentagyna, see *Stuartia pentagyna.*

Malacothamnus davidsonii, see *Malvastrum davidsonii.*

Malacothamnus fasciculatum, see *Malvastrum fasciculatum.*

Malacothamnus nuttallii, see *Malvastrum nuttallii.*

Malosma laurina, see *Rhus laurina.*

Malpighia glabra L. Wild crapemyrtle.
Range: 17.
Site: Well-drained, sun.
Fruit: Drupe.

A small to large shrub; occurs on sandy soil; fruit edible.

Malus spp.

Propagation of all species is by seed stratified 85 days at 41°–46° F.; most species grow in neutral soil.

Stomach records (in addition to specific records): Eighteen species of birds, including ruffed grouse, bobwhite, and ring-necked pheasant; composed 14.4 percent of winter food taken by ruffed grouse in the northeastern United States; opossum, dusky marmot, western skunk, gray fox, red fox; composed 0.03 percent of fruit food of eastern skunk in Michigan; found in 17.4 percent of 130 raccoon stomachs collected in winter in New York; found in 13 percent of 139 skunk stomachs examined in New York. *Observations* (in addition to specific records): Three species of birds; emergency food of greater prairie chicken; woodchuck, red squirrel, snowshoe rabbit, cottontail rabbit, gray fox; staple food of red fox in times of scarcity; an important food of raccoon in times of scarcity.

Malus angustifolia Michx. Narrowleaf crab apple.
M. sempervirens Desf., *Pyrus angustifolia* Ait.
Range: 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Pome, available September–October.

A large shrub to small or large tree; partially evergreen southward; considered by some to be a form of *M. coronaria* (q. v.).

Stomach records: Blue jay.

Malus bracteata Rehd.
Pyrus bracteata Bailey.
Range: 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Pome, available September–October.

A large shrub to small or large tree.

Malus coronaria (L.) Mill. American crab apple.
Pyrus coronaria L.
Range: 16, 19, 22, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Pome, available September–November.

A large shrub to small or large tree; blooms March–May, forms dense, spiny thickets.

Stomach records: Grosbeak, white-tailed deer. *Observations:* Ring-necked pheasant.

Malus diversifolia, see *Malus fusca.*

Malus fragrans, see *Malus glaucescens.*

Malus fusca (Raf.) Schn. (pl. 21, *B*). **Oregon crab apple.**
M. rivularis Roem., *M. diversifolia* (Bong.) Roem., *Pyrus fusca* Raf., *P. diversifolia* Bong., *P. rivularis* Dougl.
Range: 1, 2, 4.
Site: Well-drained, moist, sun.
Fruit: Pome, available August–November.

A small to large tree; flowers April–May; thicket forming; specimens usually straggling when single.

Stomach records: Robin. *Observations:* Much eaten by Oregon ruffed grouse. Not a first-class browse plant because often inaccessible on account of thicket-forming tendency but sometimes fair cattle forage.

Malus glabrata Rehd. **Crab apple.**
Pyrus glabrata Bailey.
Range: 27.
Site: Well-drained, sun.
Fruit: Pome.

A small to large tree.

Malus glaucescens Rehd. **Dunbar crab apple.**
M. fragrans Rehd., *Pyrus glaucescens* Bailey.
Range: 22, 24, 25, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Pome, available in September.

A large shrub to small or large tree; flowers April–May; commonly clump forming and spiny.

Malus ioensis (Wood) Britt. **Prairie crab apple.**
Pyrus coronaria ioensis Wood, *P. ioensis* Caruth.
Range: 20, 21, 22, 23, 25, 29.
Site: Dry, well-drained, sun.
Fruit: Pome, available September–October.

A large shrub to small tree; flowers April–May; several varieties, all occuring within the range of the species have been described.

Malus lancifolia Rehd. **Lanceleaf crab apple.**
Pyrus lancifolia Bailey.
Range: 25, 27.
Site: Dry, well-drained, sun.
Fruit: Pome.

A large shrub to small, spiny tree.

Malus malus, see *Malus pumila.*

Malus platycarpa Rehd. **Crab apple.**
Pyrus platycarpa Bailey.
Range: 25, 27.
Site: Well-drained, moist, sun.
Fruit: Pome.

A large shrub to small tree.

Malus pumila Mill. **Wild apple.**
M. malus (L.) Britt., *M. sylvestris* Mill., *Pyrus malus* L.
Range: 22, 23, 24, 25, 27, 28, 29.
Site: Well-drained, sun.
Fruit: Pome, available September–November.

A small to large tree, flowers April–May; introduced from Asia, but widely naturalized and easily escaping.

Stomach records: Three species of birds; gray fox, white-tailed deer. *Observations:* Nine species of birds, including ring-necked pheasant and mourning dove; white-tailed deer. Without doubt of extreme importance as a food-producing plant for wildlife.

Malus rivularis, see *Malus fusca.*

Malus sempervirens, see *Malus angustifolia.*

Malus soulardii (Bailey) Britt. **Soulard crab apple.**
Pyrus soulardii Bailey.
Range: 19, 20, 21, 22, 23, 25.
Site: Well-drained, sun.
Fruit: Pome.

A large shrub to small tree; presumably a cross between *M. ioensis* and *M. pumila.*

Malus sylvestris, see *Malus pumila.*

Malva fasciculata, see *Malvastrum fasciculatum.*

Malvastrum spp.
Stomach records (in addition to specific records): Three species of birds, but many species are herbaceous.

Malvastrum davidsonii Robins. **Davidson globemallow.**
Malacothamnus davidsonii (Robins.) Greene, *Sphaeralcea davidsonii* (Robins.) Jeps.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Dry carpel.
A small to large shrub.

Malvastrum fasciculatum (Nutt.) Greene. **Bushmallow.**
M. thurberi Gray, *Malva fasciculata* Nutt., *Malacothamnus fasciculatum,* Greene, *Sphaeralcea fasciculata* (Nutt.) Arthur.
Range: 5, 10.
Site: Dry, sun.
Fruit: Dry carpel.
A large shrub with wandlike branches.

Malvastrum gabrielense Munz and Johnst. **San Gabriel globemallow.**
Range: 5.
Site: Dry, sun.
Fruit: Dry carpel.
A small to large shrub.

Malvastrum nuttallii (Abrams) Dav. and Moxl. **Nuttall globemallow.**
Malacothamnus nuttallii Abrams.
Range: 5.
Site: Dry, sun.
Fruit: Dry carpel.
A large shrub.

Malvastrum thurberi, see *Malvastrum fasciculatum.*

Malvaviscus drummondii Torr. and Gray. **Texas mallow.**
Range: 17, 20; 30.
Site: Well-drained, sun.
Fruit: Berrylike carpel, available August–September.
A large shrub to small tree; usually occurs in sand; fruit edible. Of some value as forage for livestock.

Manihot carthaginensis (Jacq.) Muell.
M. chlorostica Standl. and Goldm., *Jatropha carthaginensis* Jacq.
Range: 10.
Site: Dry, sun.
Fruit: Capsule.
A large shrub to small tree; roots fleshy.

Manihot chlorostica, see *Manihot carthaginensis.*

Maytenus phyllanthoides Benth.
Range: 17, 30, 32.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A large shrub to small tree; evergreen.

Melia azedarach L. **Chinaberry.**
Range: 17, 20, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available October, falling through the winter.
A small to large tree; foliage dense; introduced from India and China and apparently completely naturalized in the regions indicated; will not stand excessive drought; free from insects; rapid growing; somewhat tolerant of salinity; much cultivated through the southern part of the country; fruit pulp is a vermifuge and a repellant of insects.
Stomach records: Three species of birds. *Observations:* Robin; western chipmunk. Fermented fruit toxic to pigs.

Melochia tomentosa L.
Range: 17.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small shrub.

Menispermum canadense L. **Moonseed.**
Range: 21, 22, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun shade.
Fruit: Drupe, available September–October.
A twining or clambering vine; flowers June–July; exceptionally fast growing; spreads by means of suckers; berries poisonous to humans. Livestock seldom, if ever, eat the plant.

Menispermum lyonii, see *Calycocarpum lyonii.*

Menodora spinescens Gray. **Menodora.**
Range: 4, 9, 10.
Site: Dry, sun.
Fruit: Capsule.
A small spinose shrub with small leaves.

Menziesia ferruginea Sm. **Rustyleaf.**
M. gabella Gray.
Range: 1, 4, 12, 23.
Site: Well-drained, moist, shade.
Fruit: Capsule, available August–September.
A small to large shrub; flowers May–June. Poisonous to livestock when eaten in large quantities.

Menziesia glabella, see *Menziesia ferruginea.*

Menziesia glanduliflora, see *Phyllodoce glanduliflora.*

Menziesia pilosa (Michx.) Pers. **Minnie-bush.**
Azalea pilosa Michx.
Range: 27.
Site: Well-drained, shade.
Fruit: Capsule.
A small to large shrub; flowers May–June.

Microrhamnus ericoides Gray. **Javelin brush.**
Range: 11, 16, 17.
Site: Dry, sun.
Fruit: Drupe, available in May.
A small to large, spiny evergreen shrub with minute leaves.

Mimosa angustissima, see *Acacia angustissima.*

Mimosa berlandieri, see *Mimosa pigra.*

Mimosa biuncifera Benth. **Catclaw.**
M. prolifica Wats., *Mimosopsis biuncifera* (Benth.) Britt. and Rose.
Range: 10, 11, 16, 20.
Site: Dry, sun.
Fruit: Legume, available in September.
A small, rarely large, thorny shrub.
Stomach records: Scaled quail. *Observations:* Gambel and scaled quail; particularly palatable to captive deer. Fairly good browse for livestock.

Mimosa borealis Gray. **Catclaw.**
M. fragrans Gray, *M. texana* Small, *M. borealis texana* Gray.
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Legume.
A small to large, much-branched, spiny, rigid shrub. Browsed by livestock but brittle and apt to be broken down with overgrazing.

Mimosa dysocarpa Benth. **Velvetpod mimosa.**
Range: 11.
Site: Dry, sun.
Fruit: Legume, available in August.
A small to large, spiny shrub.
Observations: Gambel and scaled quail. Considered fair browse for livestock.

Mimosa emoryana Benth.
Range: 11, 17.
Site: Dry, sun.
Fruit: Legume.
A small to large, spiny shrub.

Mimosa endlichii, see *Mimosa lemmonii.*

Mimosa farnesiana, see *Acacia farnesiana.*

Mimosa filiculoides, see *Acacia angustissima.*

Mimosa flexuosa Benth.
M. biuncifera flexuosa Robins., *Mimosopsis flexuosa* (Benth.) Britt. and Rose.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Legume.
A small, much-branched, spiny shrub.

Mimosa fragrans, see *Mimosa borealis.*

Mimosa grahamii Gray.
Mimosopsis grahamii (Gray) Britt. and Rose.
Range: 10.
Site: Dry, sun.
Fruit: Legume.
A small to large, spreading or decumbent shrub.

Mimosa laxiflora Benth.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Legume.
A small to large, somewhat prickly shrub.

Mimosa lemmonii Gray.
M. endlichii Harms, *Mimosopsis lemmonii* (Gray) Britt. and Rose.
Range: 11.
Site: Dry, sun.
Fruit: Legume.
A small shrub.
Stomach records: Gambel quail.

Mimosa lindheimeri Gray.
M. biuncifera lindheimeri Robins., *Mimosopsis lindheimeri* (Gray) Britt. and Rose.
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Legume.
A small, spiny shrub.

Mimosa malacophylla Benth.
Senegalia malacophylla (Benth.) Britt. and Rose.
Range: 11, 17.
Site: Dry, sun.
Fruit: Legume, available August–September.
A large, spiny, decumbent, or even climbing shrub.

Mimosa pigra L.
M. berlandieri Gray.
Range: 17.
Site: Well-drained, sun.
Fruit: Legume.
A small to large, prickly shrub.

Mimosa pringlei Wats.
Range: 11.
Site: Dry, sun.
Fruit: Legume.
A small to large, densely branched, spiny shrub.

Mimosa prolifica, see *Mimosa biuncifera.*

Mimosa texana, see *Mimosa borealis.*

Mimosa wrightii Gray.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small to large, spiny shrub.

Mimosopsis biuncifera, see *Mimosa biuncifera.*

Mimosopsis flexuosa, see *Mimosa flexuosa.*

Mimosopsis grahamii, see *Mimosa grahamii.*

Mimosopsis lemmonii, see *Mimosa lemmonii.*

Mimosopsis lindheimeri, see *Mimosa lindheimeri.*

Mimulus aridus (Abrams) Grant.
Diplacus aridus Abrams.
Range: 5, 10.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small, decumbent, evergreen shrub.

Mimulus aurantiacus Curtis. **Bush monkeyflower.**
Diplacus aurantiacus (Curtis) Jeps.
Range: 1, 4, 5.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule.

A small, sparingly branched, evergreen shrub; flowers April–September. Palatability to livestock low or negligible.

Mimulus flemingii Munz.
M. parviflorus (Greene) Grant, *Diplacus parviflorus* Greene.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small, evergreen shrub; flowers January–August.

Mimulus longiflorus (Nutt.) Grant. **Long monkeyflower.**
Diplacus arachnoides Greene, *D. longiflorus* Nutt.
Range: 5.
Site: Dry, sun.
Fruit: Capsule.

A small, profusely branched shrub. Palatability to livestock low or negligible.

Mimulus parviflorus, see *Mimulus flemingii.*

Mimulus puniceus (Nutt.) Steud. **Crimson monkeyflower.**
Diplacus puniceus Nutt.
Range: 5.
Site: Dry, sun.
Fruit: Capsule.

A small to large, freely branched shrub. Palatability to livestock low or negligible.

Mitchella repens. L. **Patridgeberry.**
Range: 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, shade.
Fruit: Berry, available July–October, often persistent throughout the year.

An evergreen vine with creeping, matted, rooting stems; flowers April–June and often again in autumn.

Stomach records: Nine species of birds including ruffed grouse, bobwhite, sharp-tailed grouse, and greater prairie chicken. *Observations:* Five species of birds, including ruffed grouse, bobwhite, and Canadian spruce grouse; much eaten by raccoon; frequently eaten by red fox.

Mohrodendron carolinum, see *Halesia carolina.*

Mohrodendron dipterum, see *Halesia diptera.*

Mohrodendron parviflorum, see *Halesia parviflora.*

Momisia aculeata, see *Celtis iguanaea.*

Momisia pallida, see *Celtis pallida.*

Morella cerifera, see *Myrica cerifera.*

Mortonia greggii Gray.
Range: 17.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A very small, everygreen shrub; usually occurs on limestone soil.

Mortonia scabrella Gray.
Range: 11.
Site: Dry, sun.
Fruit: Capsule, available in September.
A small, densely branched shrub; usually occurs on limestone soil. Not browsed by livestock.

Mortonia sempervirens Gray.
Range: 17.
Site: Well-drained, sun.
Fruit: Capsule.
A small, leafy shrub.

Mortonia utahensis (Cov.) Rydb. **Mortonia.**
M. scabrella utahensis Cov.
Range: 10.
Site: Dry, sun.
Fruit: Capsule.
A small, intricately branched shrub. Not browsed by livestock.

Morus spp. **Mulberries.**
Members of this genus are attacked by the Texas root rot caused by *Phymatotrichum omnivorum.*
Stomach records (in addition to specific records): Forty-five species of birds, including ruffed grouse and bobwhite; opossum, red fox; composed 19.54 percent of fruit food of eastern skunk in Michigan.
Observations (in addition to specific records): Twenty-eight species of birds including wild turkey; cottontail rabbit.

Morus alba L. **White mulberry.**
Range: 17, 20, 22, 25, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Compound drupe, available May–July.
A small to large, rapid-growing tree; a very variable species introduced from China but more or less naturalized in the regions indicated; some 10 varieties are distinguished in cultivation; 300,000–350,000 seeds per pound.
Stomach records: Four species of birds.

Morus celtidifolia, see *Morus microphylla.*

Morus microphylla Buckl. **Texan mulberry.**
M. celtidifolia of Sarg., not H. B. K.
Range: 10, 11, 14, 16, 17, 20.
Site: Dry, well-drained, moist, sun.
Fruit: Compound drupe, available May–June.
A large shrub to small or large tree; usually occurs on limestone soil; thicket-forming; usually dioecious; possibly not distinct from *M. celtidifolia*, a Mexican species.
Observationss Gambel, scaled, and Mearns quail; many songbirds; highly palatable the year round to captive deer.

Morus nigra L. **Black mulberry.**
Range: 17, 21, 22, 23, 24, 26, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Compound drupe, available June–August.
A small to large tree introduced ultimately from Persia but more or less naturalized in the regions indicated; 200,000 seeds per pound.

Morus rubra L. **Red mulberry.**
Range: 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Compound drupe, available May–August.

A small to large, rapid-growing tree; monoecious or dioecious; root system shallow; short-lived; much attacked by insects and fungi; wood used commercially to some extent; seed generally not very fertile; grows on various soils; 200,000 seeds per pound; a large-fruited and everbearing variety is known.

Stomach records: Twenty-one species of birds, including bobwhite.

Observations: Twenty-one species of birds; much eaten by Carolina fox squirrel; leaves refused by captive marsh rabbits.

Mozinna spathulata, see *Jatropha spathulata.*

Muscadinia munsoniana, see *Vitis munsoniana.*

Muscadinia rotundifolia, see *Vitis rotundifolia.*

Myrica spp.

Propagation of all species is by seed stratified and sown in spring; propagation by cuttings is considered difficult; most species grow in acid soil.

Stomach records (in addition to specific records): Sixty species of birds, including ruffed grouse and bobwhite. *Observations* (in addition to specific records): Hungarian partridge, ring-necked pheasant, white-tailed deer.

Myrica asplenifolia L. **Sweetfern.**
Comptonia peregrina (L.) Coult.
Range: 22, 23, 24, 25, 26, 27, 28.
Site: Dry, well-drained, sun.
Fruit: Nutlet, available September–October.

A small shrub; often forms very dense colonies, especially on poor, sterile soils, often to the exclusion of other growth; often a pasture weed; a pioneer in burned-over areas northward.

Observations: Ruffed grouse, prairie sharp-tailed grouse; white-tailed deer.

Myrica californica Cham. (pl. 21, *C*). **Pacific waxmyrtle.**
Range: 1, 5.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Waxy, nutlike, available July–June.

A large shrub to small or large tree; evergreen; occurs in sandy soil, salt marshes, or other situations; produces suckers; somewhat thicket forming.

Stomach records: Five species of birds, including California quail.

Myrica carolinensis Mill. **Bayberry.**
Cerothamnus carolinensis (Mill.) Tidest.
Range: 20, 24, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Waxy, nutlike, available June–April or longer.

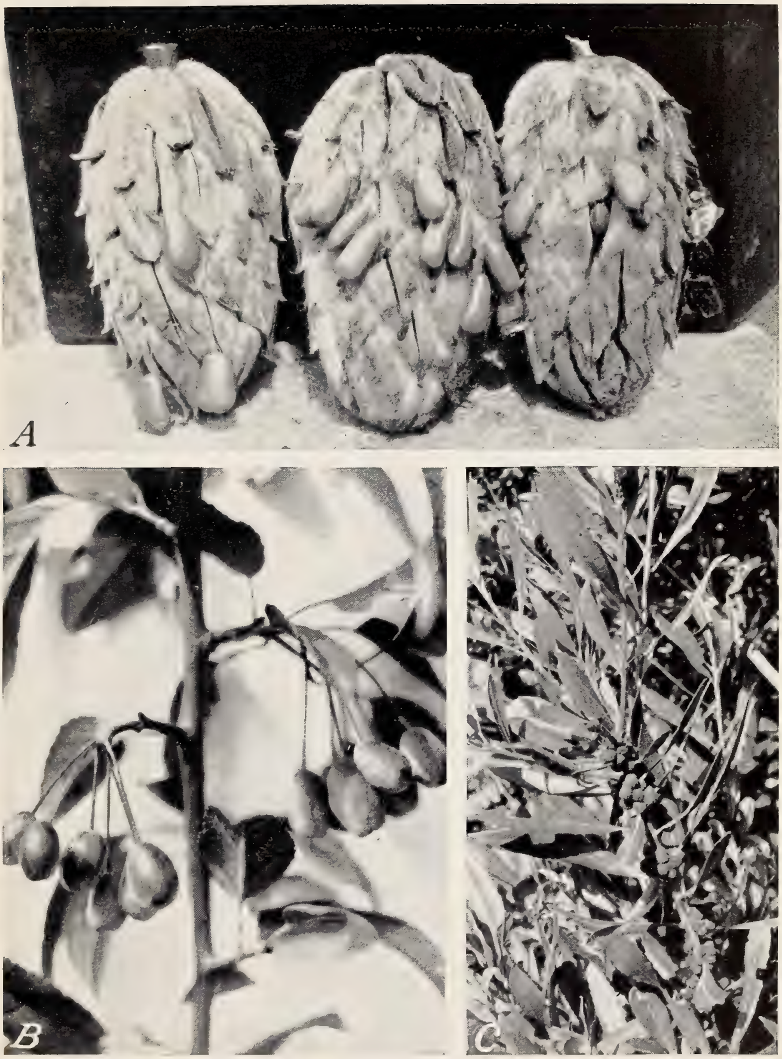
A small to large, almost evergreen shrub; occurs in sandy, or dry, sterile soil; 55,500 seeds per pound.

Stomach records: Thirty-eight species of birds, including ruffed grouse, bobwhite, and ring-necked pheasant. *Observations:* Sixteen species of birds, including bobwhite, ranks with *M. cerifera* as twentieth on the list of quail food plants of the Southeast. (Some of these observations may apply wholly or in part to *M. cerifera*).

Myrica cerifera L. (pl. 22, *A*). **Waxmyrtle.**
Morella cerifera (L.) Small, *Cerothamnus ceriferus* (L.) Small.
Range: 20, 24, 28, 29, 30, 31, 32.
Site: Well-drained, moist, sun, shade.
Fruit: Waxy, nutlike, available August–October.

A small to large shrub or rarely a small to large tree; evergreen; grows in sandy or sterile, often acid soil.

Stomach records: Forty-one species of birds including ruffed grouse, bobwhite, and wild turkey. *Observations:* Six species of birds including bobwhite; ranks with *M. caroliniana* as twentieth on the list of quail food plants of the Southeast; leaves refused by captive marsh rabbits. (See also *M. carolinensis.*)



A, Magnolia grandiflora. The fruit of the evergreen magnolia is of particular appeal to wild turkey. The fleshy red drupes, extruded from the conelike structure, are characteristic of magnolias. *B, Malus fusca.* The Oregon crab apple, ordinarily found in moist soils, may prove of value in stream-bank control. The fruits, though much smaller than those of eastern species, are similarly used by man. *C, Myrica californica.* The fruit of the Pacific waxmyrtle will probably be found to occupy the same place in the diet of western birds that the fruits of eastern waxmyrtles do in the diet of eastern birds.

A, *Myrica cerifera*. The fruits of this sand-inhabiting shrub have been found in the stomachs of 41 kinds of birds. In sand-dune control, such wildlife use may considerably enhance the value of plantings of the species. *B*, *Oxydendrum arboreum*. The ornamental flowers of the sourwood, of use in honey production, entitle this species to consideration in erosion-control planting along roadsides. (Photograph by Department of the Interior.)

Myrica gale L. **Sweetgale.**
Range: 1, 2, 4, 21, 23, 24, 26, 27.
Site: Moist, sun.
Fruit: Waxy, nutlike, available August–September.
A small to large shrub; often occurs in acid soil.
Observations: Prairie sharp-tailed grouse; casually browsed by northern white-tailed deer.

Myrica hartwegii Wats. **Sierra sweetbay.**
Range: 4.
Site: Well-drained, sun.
Fruit: Waxy, nutlike.
A small to large shrub.

Myrica inodora Bartr.
Cerothamnus inodorus (Bartr.) Small.
Range: 29, 30.
Site: Well-drained, moist, sun.
Fruit: Waxy, nutlike.
A large shrub to small or large tree; evergreen.

Myrica pumila (Michx.) Small. **Dwarf waxmyrtle.**
M. cerifera pumila Michx., *Cerothamnus pumilus* (Michx.) Small.
Range: 29, 30.
Site: Dry, sun, shade.
Fruit: Waxy, nutlike, available May–October.
A small evergreen shrub; occurs in sandy or acid soils.
Observations: Bird stomach records for *M. cerifera* should be consulted for this species.

Negundo aceroides, see *Acer negundo.*

Negundo californicum, see *Acer negundo.*

Negundo interius, see *Acer negundo.*

Negundo negundo, see *Acer negundo.*

Negundo nuttallii, see *Acer negundo.*

Negundo texanum, see *Acer negundo.*

Neillia alternans, see *Physocarpus alternans.*

Neillia capitata, see *Physocarpus capitatus.*

Neillia malvacea, see *Physocarpus malvaceus.*

Neillia opulifolia, see *Physocarpus opulifolius.*

Neltuma glandulosa, see *Prosopis chilensis.*

Neltuma juliflora, see *Prosopis chilensis.*

Neltuma velutina, see *Prosopis chilensis.*

Nemopanthus mucronata (L.) Trel. **Mountain-holly.**
Illicoides mucronata Britt.
Range: 21, 22, 23, 24, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Drupe, available July–September.
A small to large shrub; usually occurs in bogs; about 1,600 berries per pound.
Stomach records: Ruffed grouse, robin.

Neopieris mariana, see *Xolisma mariana.*

Neopieris nitida, see *Xolisma lucida.*

Neostyphonia integrifolia, see *Rhus integrifolia.*

Neostyphonia ovata, see *Rhus ovata.*

Neowashingtonia robusta, see *Washingtonia robusta.*

Nephropetalum pringlei Robins. and Greenm.
Range: 17.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small shrub.

Nicotiana glauca Graham. **Tree tobacco.**
Range: 1, 3, 5, 10, 11, 17, 20.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Capsule.

A large shrub to small tree; evergreen; introduced from South America, but naturalized in the regions indicated; foliage sparse, furnishing little soil cover; a pioneer in eroded areas; reputed to be poisonous.

Observations: Especially attractive to hummingbirds.

Nintooa japonica, see *Lonicera japonica.*

Nuttallia cerasiformis, see *Osmaronia cerasiformis.*

Nyssa sp.

Observations (in addition to specific records): Red-headed woodpecker.

Nyssa aquatica Marsh. **Tupelo gum.**
Range: 25, 29, 30.
Site: Moist, shade.
Fruit: Drupe, not available in October.

A large tree; wood not durable, used commercially to some extent.

Stomach records: Ten species of birds, including bobwhite and wild turkey.

Observations: Four species of birds.

Nyssa biflora Walt. **Swamp black gum.**
Range: 28, 29, 30.
Site: Moist, sun, shade.
Fruit: Drupe, available August–September.

A large tree; wood of little importance commercially.

Stomach records: Four species of birds, including bobwhite and wild turkey.

Nyssa ogeche Marsh. **Sour tupelo gum.**
Range: 29, 30.
Site: Moist, sun.
Fruit: Drupe, available July–August, persistent until November–December.

A large shrub, or more commonly a small to large tree; very rare and local; fruits much larger than those of other species, and edible.

Stomach records: Opossum. An important source of honey.

Nyssa sylvatica Marsh. **Black gum.**
Range: 20, 22, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe; available September–October, persistent until May or falling at once.

A large tree; root system deep, widespreading, as well as superficial; resistant to fire; not wind-firm; coppices after cutting; wood not durable in soil, used commercially; without notable insect enemies; 3,000–4,000 seeds per pound.

Stomach records: Thirty-two species of birds, including ruffed grouse, bobwhite, wild turkey, ring-necked pheasant, and greater prairie chicken; Louisiana white-tailed deer. *Observations:* Twenty-four species of birds, including ruffed grouse; greatly preferred food of wild turkey; captive marsh rabbit; favorite food of black bear; white-tailed deer.

Obione confertifolia, see *Atriplex confertifolia.*

Obione hymenelytra, see *Atriplex hymenelytra.*

Obione lentiformis, see *Atriplex lentiformis.*

Obione polycarpa, see *Atriplex polycarpa.*

Odostemon aquifolius, see *Berberis aquifolium.*

Odostemon dictyotus, see *Berberis californicum.*

Odostemon fascicularis, see *Berberis californicum* and *B. pinnata.*

Odostemon fremontii, see *Berberis fremontii.*

Odostemon haematocarpus, see *Berberis haematocarpa.*

Odosteman nervosus, see *Berberis nervosa.*

Odostemon nevinii, see *Berberis nevinii.*

Odostemon nutkanus, see *Berberis aquifolium.*

Odostemon pumilus, see *Berberis pumila.*

Odostemon repens, see *Berberis repens.*

Odostemon trifoliolatus, see *Berberis trifoliolata.*

Odostemon wilcoxii, see *Berberis wilcoxii.*

Olneya tesota Gray. **Desert ironwood.**
Range: 10, 11.
Site: Dry, well-drained, sun.
Fruit: Legume, available August–September.

A large shrub to small or large tree; flowers May–June; evergreen; somewhat spiny; foliage rather dense; 2,000 seeds per pound.

Observations: Hooded orioles; hummingbirds; much used as roosts by Gambel quail; bighorn.

The species is attacked by a mistletoe (*Phoradendron californicum*) which produces fruits attractive to many berry-eating birds. Of some value as a forage for livestock.

Oplopanax horridum (Small) Miquel. **Devilsclub.**
Fatsia horrida (Small) B. and H., *Echinopanax horridum* Decne. and Planch., *Ricinophyllum horridum* (Small) Nels. and MacBr.
Range: 1, 2, 4, 12, 13, 24.
Site: Dry, well-drained, moist, shade.
Fruit: Drupe, available July–October.

A large, straggling, large-leafed, very thorny shrub; flowers May–June.

Observations: Preferred food of Olympic wapiti.

Opulaster alabamensis, see *Physocarpus stellatus.*

Opulaster alternans, see *Physocarpus alternans.*

Opulaster australis, see *Physocarpus opulifolius.*

Opulaster bracteatus, see *Physocarpus bracteatus.*

Opulaster capitatus, see *Physocarpus capitatus.*

Opulaster glabratus, see *Physocarpus glabratus.*

Opulaster intermedius, see *Physocarpus stellatus* and *P. opulifolius.*

Opulaster monogynus, see *Physocarpus monogynus.*

Opulaster opulifolius, see *Physocarpus opulifolius.*

Opulaster pauciflorus, see *Physocarpus malvaceus.*

Oreocallis davisiae, see *Leucothoë davisiae.*

Osmanthus americanus (L.) Benth. and Hook. **Devilwood.**
Amarolea americana (L.) Small.
Range: 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available in September.

Usually a large shrub to small tree or rarely a large tree; evergreen; often occurs in sandy soil; flowers March–April.

Osmaronia cerasiformis (Torr. and Gray) Greene. **Oso berry.**
Nuttallii cerasiformis Torr. and Gray.
Range: 1, 2, 4.
Site: Well-drained, shade.
Fruit: Drupe, available July–August.

A small to large shrub; flowers March–April; fruit pulp bitter in some regions, sweet in others, but not poisonous.

Observations: Greedily eaten by many birds and mammals. Apparently of little value as forage for livestock.

Ostrya baileyi Rose. **Bailey hophornbeam.**
Range: 11, 16, 19.
Site: Dry, well-drained, sun.
Fruit: Nutlet.

A small tree.

Ostrya knowltonii Cov. **Western hophornbeam.**
Range: 9, 11.
Site: Dry, well-drained, sun.
Fruit: Nutlet.

A large shrub to small tree.

Ostrya virginiana (Mill.) Koch. **Hophornbeam.**
Range: 15, 18, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Nutlet, available August–October.

A small, very slow-growing tree. Var. *glandulosa* (Spach) Sarg., the more northern form, has been noted to be possibly the same as *O. baileyi.*

Stomach records: Five species of birds including ruffed grouse, bobwhite, ptarmigan; white-tailed deer; composed 14.73 percent of winter food of ruffed grouse in New York. *Observations:* Five species of birds, including ruffed grouse, ring-necked pheasant; staple food of northern sharp-tailed grouse in Quebec; white-tailed deer, cottontail rabbit.

Oxycoccus erythrocarpus, see *Hugeria erythrocarpa.*

Oxycoccus macrocarpus, see *Vaccinium macrocarpon.*

Oxycoccus oxycoccus, see *Vaccinium oxycoccus.*

Oxycoccus palustris, see *Vaccinium oxycoccus.*

Oxydendrum arboreum (L.) DC. (pl. 22, *B*). **Sourwood.**
Andromeda arboreum L.
Range: 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule, available September–October.

A large tree; flowers June–August; rarely attacked by insects or diseases; wood sometimes used locally.

Stomach records: White-tailed deer. A good bee plant.

Oxytenia acerosa Nutt.
Range: 9, 10.
Site: Dry, sun.
Fruit: Achene.

A large shrub, leafless and rushlike, or with leaves; often occurs on alkaline soil. Not eaten by livestock and considered poisonous to cattle by stockmen.

Pachistima canbyi Gray. **Cliffgreen.**
Range: 27.
Site: Dry, well-drained, sun, shade.
Fruit: Capsule, available August–September.

A small evergreen shrub; flowers April–May; occurs on limestone and other soils; creeping branches root.

Stomach records: White-tailed deer.

Pachistima myrsinites (Pursh) Raf. **Myrtle boxleaf.**
Range: 1, 2, 4, 9, 12, 13, 14.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Capsule, available July–September.

A small evergreen shrub; flowers May–July; densely branched, very leafy; sometimes nearly prostrate.

Stomach records: Richardson's grouse; mountain sheep, black-tailed deer, plains white-tailed deer. Occasionally browsed by livestock; rarely causes livestock poisoning.

Pachysandra procumbens Michx. **Pachysandra.**
Range: 25, 27, 28, 29, 30.
Site: Well-drained, sun, shade.
Fruit: Capsule.

A small evergreen shrub; flowers April–May; often occurs on calcareous soil; forms large clumps by means of rootstocks.

Padus alabamensis, see *Prunus alabamensis.*

Padus australis, see *Prunus australis.*

Padus caroliniana, see *Prunus caroliniana.*

Padus cuthbertii, see *Prunus cuthbertii.*

Padus nana, see *Prunus virginiana.*

Padus demissa, see *Prunus demissa.*

Padus eximia, see *Prunus eximia.*

Padus melanocarpa, see *Prunus demissa.*

Padus pumicea, see *Prunus virginiana.*

Padus rufula, see *Prunus virens.*

Padus valida, see *Prunus valida.*

Padus virens, see *Prunus virens.*

Padus virginiana, see *Prunus virginiana.*

Palmerocassia wislizenii, see *Cassia wislizenii.*

Papyrius papyrifera, see *Broussonetia papyrifera.*

Parkinsonia aculeata L. **Horsebean.**
Range: 10, 11, 16, 17, 20, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Legume.

A large shrub to small or large spiny tree; occurs in rich, sandy soils; introduced from tropical America; generally free from pests; resistant to saline conditions; often grown for hedges. Of local importance as an emergency fodder for livestock.

Parkinsonia, see *Cercidium.*

Parosela arborescens (Torr.) Heller. **Mohave dalea.**
P. neglecta Parish, *Dalea arborescens* Torr., *Psorodendron arborescens* (Torr.) Rydb.
Range: 10.
Site: Dry, sun.
Fruit: Legume.

A small, spiny shrub with slender branches; flowers April–May.

Parosela argyrea (Gray) Heller.
Dalea argyrea Gray.
Range: 11, 17.
Site: Dry, sun.
Fruit: Legume.

A small, stout shrub.

Parosela californica, see *Parosela fremontii.*

Parosela emoryi (Gray) Heller. **White dalea.**
Dalea emoryi Gray, *Psorothamnus emoryi* (Gray) Rydb.
Range: 5, 10.
Site: Dry, sun.
Fruit: Legume.

A small, densely branched shrub; flowers April–May; occurs on sandy and other soils.

Parosela formosa (Torr.) Vail. **Feather peabush.**
Dalea formosa Torr.
Range: 9, 10, 11, 14, 16, 17, 20.
Site: Dry, sun.
Fruit: Legume.

A small, much-branched shrub; flowers April–October; very handsome in flower.

Observations: Particularly palatable to captive deer. Of little importance as forage for livestock.

Parosela fremontii (Torr.) Vail. **Fremont dalea.**
Dalea fremontii Torr., *D. wheeleri* Vail, *Psorodendron fremontii* (Torr.) Rydb.
Range: 9, 10, 11.
Site: Dry, sun.
Fruit: Legume.

A small shrub; flowers April–June.

Var. *saundersii* McB., (*Dalea saundersii* Parish, *P. saundersii* Abrams), occurs in region 10. Var. *johnsonii* (Wats.) Jeps., (*Dalea johnsonii* Wats., P. *johnsonii* Vail., *Dalea amoena* Wats., *Psorodendron johnsonii* Rydb.), is more leafy than the species. Var. *californica* (Wats.) Jeps., (*Dalea californica* Wats., *P. californica* (Wats.) Vail, *Psorodendron californicum* Rydb.), has also been described.

Parosela frutescens (Gray) Vail.
Dalea frutescens Gray.
Range: 11, 14, 16, 17, 20, 30.
Site: Dry, sun.
Fruit: Legume.

A small, very drought-resistant shrub. Somewhat browsed by livestock.

Parosela greggii (Gray) Heller.
Dalea greggii Gray.
Range: 10, 11.
Site: Dry, sun.
Fruit: Legume.

A small shrub. Much browsed by livestock.

Parosela johnsonii, see *Parosela fremontii.*

Parosela neglecta, see *Parosela arborescens.*

Parosela polyadenia (Torr.) Heller. **Nevada dalea.**
Dalea polydeni Torr., *Psorothamnus polyadenius* (Torr.) Rydb., *Psorothamnus subnudus* Rydb.
Range: 9, 10.
Site: Dry, sun.
Fruit: Legume.

A small to large, stout, intricately-branched, spiny shrub; flowers May–June; occurs in sandy and other soils.

Parosela sanctae-crucis Rydb.
Range: 11.
Site: Dry, sun.
Fruit: Legume.

A small shrub.

Parosela saundersii, see *Parosela fremontii.*

Parosela schottii (Torr.) Heller. **Mesa dalea.**
Dalea schottii Torr., *Psorodendron schottii* (Torr.) Rydb., *Psorodendron puberulum* Rydb.
Range: 10.
Site: Dry, sun.
Fruit: One-seeded legume, available in June.

A small to large, slender, densely branched shrub; flowers in April; commonly occurs in gravelly soils; somewhat spinose.

Parosela scoparia (Gray) Heller (pl. 23, *A*).
Dalea scoparia Gray, *Psorothamnus scoparius* (Gray) Rydb.
Range: 11.
Site: Dry, sun.
Fruit: Legume.

A small, broomlike shrub with rigid, slender stems and minute leaves; very drought resistant; occurs on sandy soil and has been recommended for use as a sand-binding plant.

Parosela sessilis (Gray) Rydb.
Dalea wislizenii sessilis Gray.
Range: 10, 11.
Site: Dry, sun.
Fruit: Legume.

A small shrub.

Parosela spinosa (Gray) Heller. **Smoketree.**
Dalea spinosa Gray, *Psorodendron spinosum* (Gray) Rydb.
Range: 10.
Site: Dry, sun.
Fruit: Legume.

A large shrub to small tree; flowers January–July; leaves few, early deciduous; very spiny; fruit produced rarely, very showy in flower. Not eaten by livestock.

Parosela thyrsiflora (Gray) Vail.
P. soralea humilis Mill., *Dalea thyrsiflora* Gray.
Range: 11, 17.
Site: Dry, sun.
Fruit: Legume.

A small shrub.

Parosela wheeleri, see *Parosela fremontii.*

Parryella filifolia Torr. and Gray.
Range: 11.
Site: Dry, sun.
Fruit: One-seeded legume.

A small, much-branched shrub; grows in sandy soil.

Parthenium incanum H. B. K. **Mariola.**
P. ramosissimum DC.
Range: 11, 17.
Site: Dry, sun.
Fruit: Achene.

A small shrub; furnishes a small amount of rubber. New shoots and flower heads sometimes nibbled by livestock.

Parthenium ramosissimum, see *Parthenium incanum.*

Parthenocissus spp.
Observations (in addition to specific records): Frequently eaten by red fox; much eaten by raccoon in New York.

Parthenocissus heptaphylla (Buckl.) Small.
P. texana Rehder, *Ampelopsis heptaphylla* Buckl., *Psedera heptaphylla* (Buckl.) Greene.
Range: 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Berry.

A high-climbing vine; occurs on rocky or sandy soil; propagated by cuttings; easily transplanted.

Parthenocissus hirsuta, see *Parthenocissus quinquefolia.*

Parthenocissus laciniata, see *Parthenocissus vitacea.*

Parthenocissus quinquefolia (L.) Planch. (pl. 25, *A*). **Virginia creeper.**
Psedera quinquefolia (L.) Greene, *Ampelopsis quinquefolia* Michx.
Range: 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Berry available August–February.

A high-climbing or trailing vine; occurs in sand, loam, clay, and other soils; claimed to remain on fence posts not following the wires when planted along fences; has been used as a cover on rocky roadsides; resists grazing well; 12,000–19,000 seeds per pound.

Var. *hirsuta* (Donn.) Rehder (*P. hirsuta* (Donn.) Small), is more hairy than the species.

Stomach records: Thirty-eight species of birds including ruffed grouse, bobwhite, wild turkey, ring-necked pheasant, and greater prairie chicken; skunk. *Observations:* Eleven species of birds, including ruffed grouse, ring-necked pheasant, wild turkey; white-tailed deer, eastern chipmunk.

Parthenocissus texana, see *Parthenocissus heptaphylla.*

Parthenocissus vitacea (Knerr.) Hitchc. **Virginia creeper.**
P. laciniata Small, *Psedera vitacea* Greene.
Range: 9, 11, 14, 15, 16, 17, 20, 22, 25, 27, 28, 29.
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available August–October.

Usually a low and rambling, or rarely a high-climbing, vine; occurs in a variety of soils; very rapid growing and vigorous; growth increases with water, but comparatively drought resistant; claimed not to stay on fence posts but to follow the wires when planted along fences.

Observations: Birds especially fond of the berries.

Pasania densiflora, see *Lithocarpus densiflora.*

Pavonia lasiopetala Scheele. **Pavonia.**

P. wrightii Gray, *Malache lasiopetala* (Scheele) Kuntze.

Range: 17, 20, 30.
Site: Dry, sun.
Fruit: Capsule.

A small shrub; ornamental in cultivation. Apparently has little browse value.

Pavonia wrightii, see *Pavonia lasiopetala.*

Pectis taxifolia, see *Chrysactinia mexicana.*

Pentstemon antirrhinoides Benth. **Snapdragon pentstemon.**

Range: 5.
Site: Dry, sun.
Fruit: Capsule.

A small to large, bushy evergreen shrub; flowers April–May.

Var. *microphyllus* (Gray) Munz and Johnst., occurring in regions 10, 11, and 14, is considered fair browse for sheep and goats in times of scarcity.

Pentstemon breviflorus Lindl. **Shortflower pentstemon.**

Range: 4.
Site: Dry, sun.
Fruit: Capsule.

A small to large evergreen shrub; forms loose clumps. Locally useful as sheep browse.

Pentstemon cordifolius Benth. **Heartleaf pentstemon.**

Range: 5.
Site: Dry, sun.
Fruit: Capsule.

A large, loosely branched shrub; flowers June–July.

Pentstemon lemmonii Gray. **Bush beardtongue.**

Range: 4.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.

A small shrub; flowers July–August. Locally valuable as sheep browse.

Pentstemon rothrockii Gray. **Rothrock pentstemon.**

Range: 4.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small, loosely branched shrub.

Peraphyllum ramosissimum Nutt. **Squaw-apple.**

Range: 4, 12, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Pome, available July–September.

A small to large, intricately branched, rigid shrub; flowers April–May; fruit occasionally not formed owing to late frosts but very abundant when produced; rarely does well in cultivation.

Apparently of some value as sheep and cattle browse, although this is questioned by some authorities.

Persea borbonia (L.) Spreng. **Redbay.**

Tamala borbonia (L.) Raf.

Range: 17, 29, 30.
Site: Moist, sun.
Fruit: Drupe, available August–September.

A small to large evergreen tree; flowers April–June; wood formerly used commercially.

Stomach records: Two species of birds.

Persea humilis Nash. Silkbay.
Tamala humilis (Nash) Small.
Range: 17, 30.
Site: Well-drained, sun.
Fruit: Drupe.
A large shrub to small tree; evergreen; usually occurs in sandy soil.

Persea palustris, see *Persea pubescens.*

Persea pubescens (Pursh) Sarg. Swampbay.
P. palustris Sarg., *Laurus carolinensis pubescens* Pursh, *Tamala pubescens* (Pursh) Small.
Range: 20, 28, 29, 30, 31.
Site: Moist, sun.
Fruit: Drupe, available in September, long persistent.
A small to large evergreen tree; flowers May–July.
Stomach records: Bobwhite, fish crow.

Petrophytum acuminatum, see *Spiraea caespitosa.*

Petrophytum caespitosum, see *Spiraea caespitosa.*

Peucephyllum schottii Gray. Pigmy-cedar.
Range: 10.
Site: Dry, sun.
Fruit: Achene.
A small to large, much-branched, small-leaved shrub.

Phenianthus sempervirens, see *Lonicera sempervirens.*

Philadelphus spp. Mockoranges.
Most species are free from insects and diseases, and most occur in neutral soil.
Stomach records (in addition to specific records): Mountain sheep.

Philadelphus argenteus, see *Philadelphus microphyllus.*

Philadelphus argyrocalyx Woot. Mockorange.
P. ellipticus Rydb.
Range: 9, 11, 14.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A large shrub.

Philadelphus californicus, see *Philadelphus lewisii.*

Philadelphus columbianus, see *Philadelphus lewisii.*

Philadelphus confusus, see *Philadelphus lewisii.*

Philadelphus ellipticus, see *Philadelphus argyrocalyx.*

Philadelphus gloriosus, see *Philadelphus inodorus.*

Philadelphus gordonianus, see *Philadelphus lewisii.*

Philadelphus grandiflorus, see *Philadelphus inodorus.*

Philadelphus hirsutus Nutt. Mockorange.
Range: 27, 28.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.
A large, straggling shrub; flowers May–June.

Philadelphus inodorus L. Mockorange.
Range: 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A large shrub; flowers May–June.
Var. *grandiflorus* (Willd.) Gray, (*P. grandiflorus* Willd., *P. gloriosus* Beadle) has larger flowers and occurs within range of the species.

Philadelphus intectus, see *Philadelphus pubescens.*

Philadelphus lewisii Pursh. **Mockorange.**
P. confusus Piper.
Range: 4, 6, 7, 8, 12.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large shrub; flowers May–August.

Var. *californicus* Gray, (*P. californicus* Benth.) occurs in region 4, Var. *gordonianus* Jeps. (*P. gordonianus* Lindl., *P. columbianus* Koehne.) occurs in regions 1, 2, and 4.

Observations: Foliage browsed by deer in California; seed eaten by quail and squirrels.

Philadelphus mearnsii Evans. **Mockorange.**
Range: 14.
Site: Well-drained, sun.
Fruit: Capsule.

A small shrub.

Philadelphus microphyllus Gray. **Mockorange.**
P. argenteus Rydb.
Range: 4, 11, 13, 14.
Site: Well-drained, sun.
Fruit: Capsule.

A large shrub; flowers June–August.

Observations: Mexican bighorn.

Philadelphus occidentalis Nels. **Mockorange.**
Range: 9, 11, 12, 13, 14.
Site: Well-drained, sun.
Fruit: Capsule.

A small shrub; flowers July–August, very floriferous and fragant.

Philadelphus pubescens Loisel. **Mockorange.**
Range: 25, 29.
Site: Well-drained, sun.
Fruit: Capsule.

A large shrub; flowers June–July.

Var. *intectus* Moore, (*P. intectus* Beadle) occurs in region 25.

Philadelphus pumilus, see *Philadelphus serpyllifolius.*

Philadelphus serpyllifolius Gray. **Mockorange.**
P. pumilus Rydb.
Range: 5, 9, 10, 11, 16, 20.
Site: Dry, sun.
Fruit: Capsule.

A small, straggling shrub; branches commonly bent down at their ends.

Photinia arbutifolia Lindl. (pl. 23, *B*). **Christmasberry.**
Heteromeles arbutifolia Roem. *H. salicifolia* (Presl.) Abrams.
Range: 3, 4, 5.
Site: Dry, well-drained, sun, shade.
Fruit: Berrylike pome, available October–February.

A large, bushy shrub to small or rarely large tree; evergreen; foliage dense; somewhat tolerant of saline conditions; not inflammable; crown sprouts vigorously after a fire or when cut; a pioneer on eroded land; extensively used for Christmas greens.

Stomach records: Four species of birds, including California quail; raccoon.

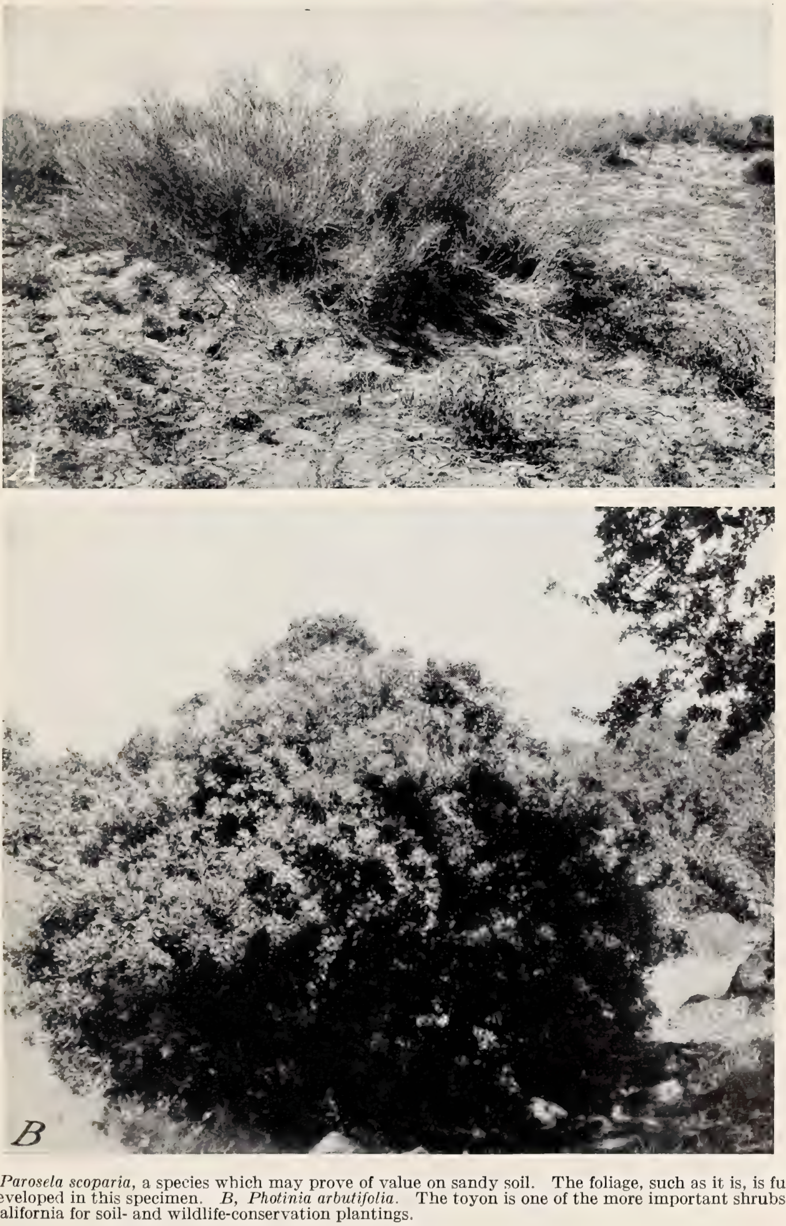
Observations: Seven species of birds, including band-tailed pigeon; of slight importance as browse for mule deer; much eaten by birds generally.

Phyllodoce spp.

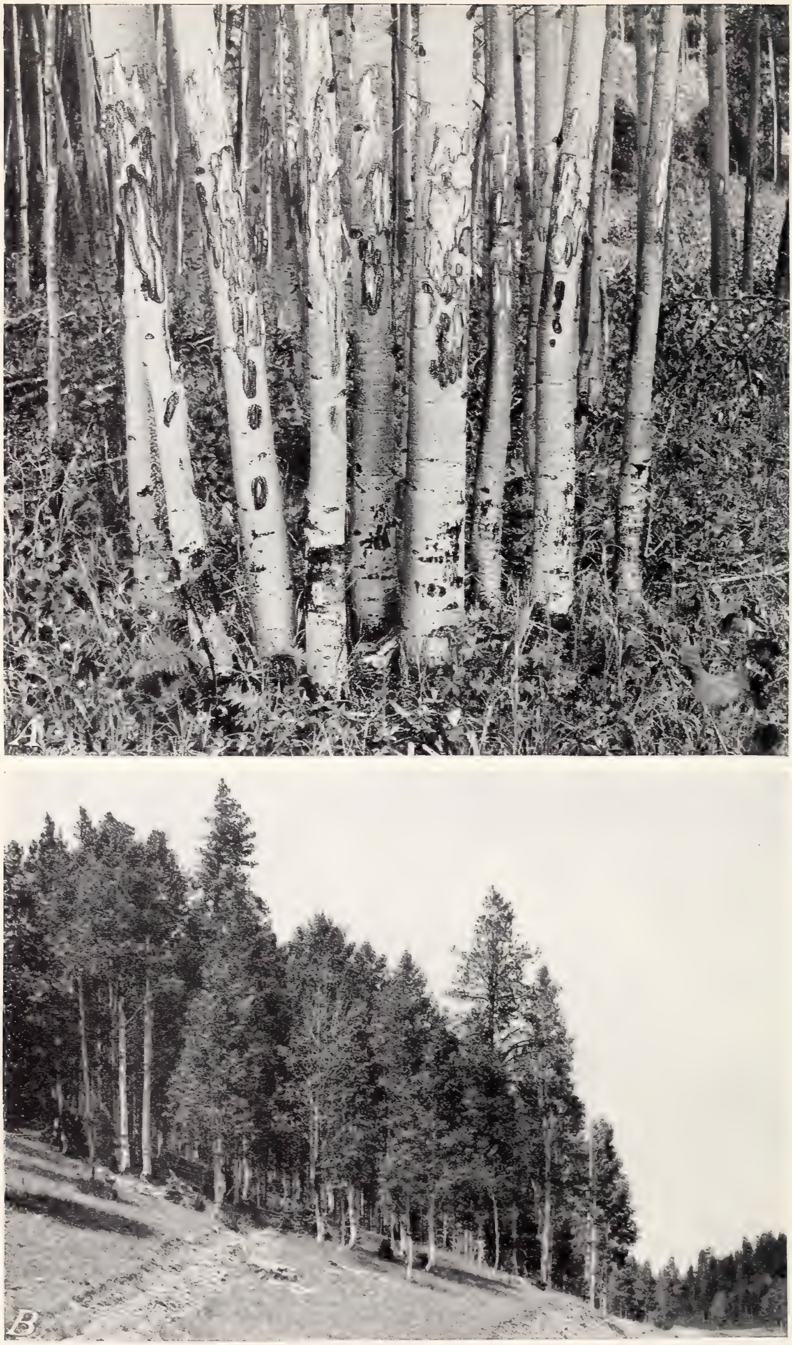
Stomach records (in addition to specific records): Mountain sheep.

Phyllodoce breweri (Gray) Heller. **Red heather.**
Range: 4.
Site: Well-drained, sun.
Fruit: Capsule.

A small evergreen shrub; flowers July–August.



A, *Parosela scoparia*, a species which may prove of value on sandy soil. The foliage, such as it is, is fully developed in this specimen. *B*, *Photinia arbutifolia*. The toyon is one of the more important shrubs in California for soil- and wildlife-conservation plantings.



Populus tremuloides: *A*, Tooth marks indicate that quaking aspen is sometimes used as food by elk. It is of prime importance to beaver. *B*, A characteristically thick grove of quaking aspen, a rapid-growing species of great importance as soil cover and wildlife food. (Photographs by Department of the Interior.)

Phyllodoce caerulea (L.) Bab. **Mountainheath.**
Andromeda caerulea L., *Bryanthus taxifolius* Gray.
Range: 26.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small evergreen shrub; flowers July–August.

Phyllodoce empetriformis (Sm.) Don. **Red heather.**
Range: 1, 4, 12, 13.
Site: Well-drained, sun.
Fruit: Capsule.
A small evergreen shrub; flowers July–August.
Stomach records: Mountain sheep.

Phyllodoce glanduliflora (Hook) Cov. **Yellow heather.**
Menziesia glanduliflora Hook.
Range: 1, 4, 12.
Site: Well-drained, sun.
Fruit: Capsule.
A small, tufted, matted evergreen shrub.

Physocarpus spp.
Most species are free from insects and diseases; most occur in neutral soil; propagation of all species is much easier by cuttings than by seed.

Physocarpus alternans (Jones) Howell.
Neillia alternans Jones, *Opulaster alternans* (Jones) Heller.
Range: 10 (at high elevations), 13.
Site: Dry, well-drained, sun.
Fruit: Follicle.
A small to large, densely branched shrub; flowers June–August.

Physocarpus australis, see *Physocarpus opulifolius.*

Physocarpus bracteatus (Rydb.) Rehd.
Opulaster bracteatus Rybd.
Range: 13.
Site: Well-drained, sun.
Fruit: Follicle.
A small to large shrub; flowers June–July.

Physocarpus capitatus (Pursh) Kuntze. **Ninebark.**
Opulaster capitatus (Pursh) Kuntze, *Neillia capitata* Greene.
Range: 1, 2, 4.
Site: Well-drained, moist sun, shade.
Fruit: Follicle.
A large, often gregarious shrub; flowers April–July.

Physocarpus glabratus (Rydb.) Rehd.
Opulaster glabratus Rydb.
Range: 13.
Site: Well-drained, sun.
Fruit: Follicle.
A small, very floriferous shrub; flowers June–July.

Physocarpus intermedius, see *Physocarpus opulifolius.*

Physocarpus malvaceus Kuntze. **Mallow ninebark.**
P. pauciflorus Piper, *Spiraea pauciflora* Nutt., *Neillia malvacea* Greene.
Range: 4, 7, 12, 13.
Site: Well-drained, sun.
Fruit: Follicle.
A small to large shrub; flowers May–July; root system comparatively shallow; rhizomes long. Considered fairly good browse for sheep, goats, and occasionally cattle.

Physocarpus michiganensis, see *Physocarpus opulifolius.*

Physocarpus missouriensis, see *Physocarpus opulifolius.*

Physocarpus monogynus (Torr.) Coult.
P. torreyi Maxim., *Opulaster monogynus* (Torr.) Kuntze.
Range: 11, 12, 13, 14, 15.
Site: Well-drained, sun.
Fruit: Follicle.
A small shrub; flowers May–July.

Physocarpus opulifolius (L.) Maxim. **Ninebark.**
P. australis (Rydb.) Rehd., *P. michiganensis* Daniels, *Spiraea opulifolia* L., *Opulaster opulifolius* (L.) Kuntze, *O. pauciflorus* (Torr. and Gray) Heller, *Neillia opulifolia* Brew. and Wats.
Range: 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Follicle, available September–October.
A large shrub; flowers June–July; 1,600,000 seeds per pound.

Var. *intermedius* (Rydb.) Robins., (P. *intermedius* Schneid., *O. intermedius* Rydb., *P. missouriensis* Daniels) occurs also in regions 15, 16, 18, and 19.

Stomach records: Three species of birds

Physocarpus pauciflorus see *Physocarpus malvaceus.*

Physocarpus stellatus (Rydb.) Rehd.
Opulaster stellatus Rydb., *Opulaster alabamensis* Rydb., *Opulaster intermedius* Small, not Rydb.
Range: 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Follicle.
A small to large shrub; flowers May–June.

Physocarpus torreyi, see *Physocarpus monogynus.*

Picea spp. **Spruces.**

Evergreen, monoecious trees with cones maturing in a single season; important timber trees and unsurpassed as producers of paper pulp.

Stomach records (in addition to specific records): Twenty-eight species of birds, including ruffed grouse, Hungarian partridge, ring-necked pheasant; porcupine, black-tailed deer. *Observations* (in addition to specific records): Fifteen species of birds, including spruce, ruffed, Franklin, and dusky grouse; much eaten by Cascade squirrel; Sierra chickaree, Richardson's squirrel, Townsend's chipmunk, Allen's chipmunk, Digger squirrel, Fremont pine squirrel, spruce squirrel, Olympic black bear, Arizona porcupine; rarely cut for building material, not food, by beaver.

Picea alba, see *Picea australis* and *P. canadensis.*

Picea albertiana Brown. **Western white spruce.**
P. glauca albertiana (Brown) Rehd.
Range: 4, 12, 15 (Black Hills).
Site: Well-drained, sun.
Fruit: Cone.
A large evergreen tree.

Picea amabilis, see *Abies amabilis.*

Picea australis Small. **Southern spruce.**
P. alba Chapm.
Range: 27.
Site: Dry, well-drained, sun.
Fruit: Cone.
A large evergreen tree.

Picea breweriana Wats. **Weeping spruce.**
Range: 4.
Site: Dry, well-drained, sun, shade.
Fruit: Cone; ripe in early fall, seed shed September–October, cones soon falling.

A large evergreen tree; slow growing; wood of no importance commercially; has proven unsatisfactory in cultivation; very local in distribution; good seed years every 2 or 3 years.

Picea canadensis (Mill.) B. S. P. White spruce.
P. glauca (Moench.) Voss., *P. alba* Link.
Range: 12, 15 (Black Hills), 21, 23, 24, 26, 27.
Site: Well-drained, sun, shade.
Fruit: Cone; seeds shed in September, cones soon falling.

A large evergreen tree; root system shallow and spreading; wood of great importance commercially; seed produced locally every year but heavy seed production occurs at intervals of 5 to 8 years; vitality of seed persistent; 130,000–230,000 seeds per pound. Ten horticultural varieties are in cultivation; long-lived.

Stomach records: Crossbill; mountain sheep, plains white-tailed deer. *Observations:* Eight species of birds; porcupine, red squirrel, moose; casually browsed by northern white-tailed deer.

Picea engelmannii (Parry) Engelm. Engelmann spruce.
P. parryana Sarg.
Range: 4, 9, 11, 12, 13, 14, 15.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Cone; mature in August, seeds shed by October, cones falling by spring.

A large evergreen tree; root system shallow; growth fair on dry soil; long-lived; wood much used commercially; 0.5 pound of seed per bushel of cones, 69,000–376,000 seeds per pound; germination 34–68 percent; seeds produced in quantity locally about every 3 years; seed vitality persistent, as much as 30–50 percent after 5 years when properly stored.

Stomach record: Three species of birds, including dusky grouse; black-tailed deer, plains white-tailed deer. *Observations:* Red squirrel, porcupine, bighorn.

Picea glauca, see *Picea canadensis*.

Picea mariana (Mill.) B. S. P. Black spruce.
P. mariana brevifolia Rehd.
Range: 23, 24, 26, 27.
Site: Well-drained, moist, sun, shade.
Fruit: Cone; mature in August, persistent many years.

A large evergreen tree; commonly most abundant on acid soils; root system shallow and widespreading; slow growing; somewhat damaged by insects and fungi; wood of little importance commercially; seeds produced abundantly at irregular intervals; 540,000 seeds per pound, vitality persistent; prostrate branches often root.

Stomach records: Blue heron, crossbill. *Observations:* Seven species of birds; snowshoe hare, porcupine.

Picea parryana, see *Picea engelmannii* and *P. pungens*.

Picea pungens Engelm. Blue spruce.
P. parryana (Andre) Parry.
Range: 9, 12, 13, 14.
Site: Well-drained, moist, sun.
Fruit: Cone; available in August, seeds shed in September, most cones persistent until the following autumn.

A large evergreen tree; root system shallow in wet soils; deeper in dry soils; long-lived; wood of least value commercially of the spruces; abundant seed crops produced every 2 or 3 years; 80,000–130,000 seeds per pound, germination 48–77 percent, vitality long persistent; brilliant color of forms (as Koster spruce) gradually lost with age.

Stomach records: Black-tailed deer. *Observations:* Three species of birds.

Picea rubens, see *Picea rubra*.

Picea rubra Link. Red spruce.
P. rubens Sarg.
Range: 27.
Site: Well-drained, moist, sun, shade.
Fruit: Cone; available in September, most seeds falling by late fall, a few the following spring.

A large evergreen tree; root system shallow and superficial; slow growing, especially when young; often attacked by bark beetles, much wind and frost damaged; rarely injured by fire; wood of great importance commercially; 130,000–140,000 seeds per pound, abundantly produced at intervals of 6 to 8 years, germination 50–75 percent.

Observations: Much eaten by red squirrel.

Picea sitchensis (Bong.) Carr. **Sitka spruce.**

Range: 1.
Site: Well-drained, moist, sun.
Fruit: Cone; available in September, seeds soon shed, cones soon falling.

A large evergreen tree; root system shallow in moist soil, much deeper in drier ones; seedlings, but not mature trees, are tolerant of shade; wood much used commercially; about 260,000 seeds per pound, germination 40 percent; abundant seed crops every 2 or 3 years; seeds with persistent vitality; seedlings sensitive to frost.

Stomach records: Bufflehead; stone caribou. *Observations:* Much eaten by Douglas' squirrel.

Pickeringia montana Nutt. **Chaparral pea.**

Xylothermia montana (Nutt.) Greene.
Range: 4, 5.
Site: Dry, sun.
Fruit: Legume.

A small to large, densely branched, spiny, evergreen shrub, flowering May–June; fruits sparingly produced; crown sprouts after fire; uncovered roots will sprout; nodules resembling those of *Ceanothus* occur on the roots in very large clusters. Var. *tomentosa* (Abrams) Johnst. is a hairy form.

Observations: California mule deer.

Picrothamnus desertorum, see *Artemisia spinescens.*

Pieris floribunda (Pursh) Benth. **Mountain fetter-bush.**

Andromeda floribunda Pursh.
Range: 27.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small evergreen shrub with dense foliage; usually occurs on acid soil; flowers April–June; 1,250,000 seeds per pound.

Stomach records: White-tailed deer.

Pieris mariana, see *Xolisma mariana.*

Pieris nitida, see *Xolisma lucida.*

Pinckneya pubens Michx. **Fevertree.**

Range: 29, 30.
Site: Moist, sun, shade.
Fruit: Capsule, available September–October.

A large shrub to small or large tree; flowers May–June; very rare and local in occurrence.

Pinus spp. **Pines.**

Probably the most important genus of timber trees in the world, and the largest of the coniferous group. All are evergreen trees. The cones produced may be from 1 to 24 inches long and the seeds are usually, but not always, winged. Some seeds are shed at once, others require up to three seasons to mature. About 70 species are known in the world, 36 occurring in North America.

Stomach records (in addition to specific records): Forty-seven species of birds, including ruffed grouse, bobwhite, dusky grouse, ring-necked pheasant, Richardson's grouse, and sharp-tailed grouse; mountain sheep, opossum, black-tailed deer, spotted skunk, gray fox, white-tailed deer. *Observations* (in addition to specific records): Thirty species of birds, including ruffed grouse, band-tailed pigeon, dusky grouse, mourning dove, ring-necked pheasant; ranks third in the list of quail food plants for southeastern United States; an emergency food of pinnated grouse; important food of porcupine; Siskiyou chipmunk, Allen's chipmunk, Merriam's chipmunk, Douglas' squirrel, Cascade squirrel, Richardson's squirrel, Digger squirrel, Arizona gray squirrel, red spruce squirrel, rock squirrel, Fremont squirrel, many flying squirrels; Texas plains coyote, New Mexico black bear, Olympic black bear.

The five-needled pines are variously restricted by plant-quarantine measures, and movement or planting of stock should be preceded by conferences with State and/or Federal authorities. Certain species, because of their susceptibility to Woodgate rust, are prohibited from interstate movement in the State of New York.

Pinus albicaulis Engelm. **Whitebark pine.**

Apinus albicaulis (Engelm.) Rydb.

Range: 1, 4, 12, 13.

Site: Dry, well-drained, sun.

Fruit: Cone; matures in August–September of the second season, persistently closed; seeds only liberated through the rotting of the cones.

A large shrub to small or large tree; leaves five; often dwarfed and prostrate, especially in alpine situations; more tolerant of shade in moist than in dry situations; susceptible to blister rust; wood soft and brittle; 2,800 seeds per pound, germination 20 percent.

Observations: Clark's crow; porcupine, bighorn, red squirrel; seeds commonly extracted by squirrels and birds from the cones.

Pinus apacheca Lemmon. **Apache pine.**

Range: 11, 14.

Site: Well-drained, sun.

Fruit: Cone; available September–October of the second season, soon falling.

A large evergreen tree; leaves commonly three in a cluster; taproot well developed in seedling stages; at first rapid growing, later slower; intolerant of shade except when very young; wood hard.

Observations: Seeds much eaten by birds and rodents.

Pinus aristata Engelm. **Bristlecone pine.**

Range: 9, 10, 11, 13, 14.

Site: Dry, well-drained, sun.

Fruit: Cone; mature in August of the second season, seeds shed September–October.

A large evergreen tree; five-needled; often stunted at high elevations; withstands prolonged drought in its native habitat; wood not used commercially; susceptible to blister rust; 16,000 seeds per pound, 0.88 pound of seed per bushel of cones; germination of seed 66 percent.

Observations: Seeds much eaten by rodents; porcupine.

Pinus arizonica Engelm. **Arizona pine.**

P. ponderosa arizonica Shaw.

Range: 11, 14.

Site: Dry, well-drained, sun.

Fruit: Cone mature August–September of the second season, seeds soon shed, cones soon falling.

A large evergreen tree; commonly five-needled; intolerant of shade except in seedling stages; wood of limited use commercially.

Pinus attenuata Lemmon. **Knobcone pine.**

P. tuberculata Gord.

Range: 4, 10.

Site: Dry, well-drained, sun.

Fruit: Cone; mature in September of the second season, persistent, closed as long as 30 years, opening when heated.

A small to large evergreen tree; three-needled; very resistant to drought in its native habitats; easily killed by fire; intolerant of shade; wood soft; seeds produced annually abundantly; seed vitality persistent.

Pinus australis Michx. **Longleaf pine.**

P. palustris Mill., in part.

Range: 28, 29, 30.

Site: Dry, well-drained, sun.

Fruit: Cone; seeds shed October–November of the second season, cones soon falling.

A large evergreen tree; three-needled; often occurs in sandy soil; possesses a massive taproot; very intolerant of shade; does not form dense woods; fairly resistant to fire; susceptible to bark beetle damage as well as rot; difficult to transplant; a timber tree of the first importance, the principal source of rosin and turpentine in the United States.

Stomach records: Seven species of birds, including bobwhite. *Observations:* Crossbill; much eaten by Carolina fox squirrel and other squirrels.

Pinus balfouriana Murr. **Foxtail pine.**

Range: 4.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in August of the second season, seeds shed in September, cones soon falling.

A small to large evergreen tree; five-needled; endures extreme drought in its native habitat; intolerant of shade; wood soft, of little importance commercially; susceptible to blister rust.

Observations: Porcupine; much eaten by birds and rodents; of slight importance as browse for mule deer.

Pinus banksiana Lam. **Jack pine.**

P. divaricata (Ait.) Du Mont.
Range: 23, 24, 26, 27.
Site: Dry, well-drained, moist (rare), sun.
Fruit: Cone; mature in September of the second season, seeds shed irregularly over several years; cones persistent 12 to 25 years.

A large evergreen tree; two-needled; often occurs in sandy or rocky soil; at first rapid growing, later slower; intolerant of shade; except for the attacks of *Peridermium cerebrum*, generally free from most conifer diseases; has been successfully established in the sand-hill section of western Nebraska; wood decays rapidly in the soil, much used commercially; 105,000–164,000 seeds per pound, germination 54 percent.

Stomach records: One species of bird. *Observations:* Porcupine.

Pinus brachyptera Engelm. **Rocky mountain yellow pine.**

P. ponderosa scopulorum Engelm., *P. scopulorum* (Engelm.) Lemmon.
Range: 9, 11, 12, 13, 14, 15.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in August of the second season, seeds shed in September, cones soon falling.

A very large evergreen tree; three-needled; forms a long taproot in seedling stages but laterals form later; grows on almost any kind of soil; rapid growing especially in juvenile stages; very intolerant of shade; resistant to fire; susceptible to red rot in pure stands and much attacked by insects; wood not durable in the soil, of great importance commercially; 10,000–20,000 seeds per pound, germination 37–61 percent, about 5,000 usable plants per pound of seed.

Stomach records: Richardson's grouse, mountain sheep, plains white-tailed deer, black-tailed deer. *Observations:* Five species of birds; white-tailed squirrel, Richardson's pine squirrel, Abert's squirrel, tassel-eared squirrel, spruce squirrel, Say's ground squirrel, chestnut-mantled ground squirrel. Records of utilization of *P. ponderosa* Douglas may apply partially to this species.

Pinus caribaea Morel. **Slash pine.**

P. heterophylla (Ell.) Sudw.
Range: 30, 31, 32.
Site: Well-drained, moist, sun.
Fruit: Cone; mature in October, seeds shed the following spring.

A large evergreen tree; two- to three-needled; occurs in sandy and other soils; rapid growing; subject to red heart or red rot especially northward; wood hard, strong, tough, durable, of value commercially; susceptible to Woodgate rust; 15,500 seeds per pound, germination 36–85 percent.

Pinus cembroides Zucc. **Mexican piñon.**

Range: 11, 14, 16, 17.
Site: Dry, well-drained, sun.
Fruit: Cone; ripe in September, seeds shed by October, cones soon falling.

A small or rarely large, bushy, evergreen tree; commonly three-needled; slow growing; intolerant of shade; wood used for fuel; only the scales in the middle of the cone bear seeds; 1,500 seeds per pound, vitality transient.

Observations: Thick-billed parrot; birds and rodents.

Pinus chihuahuana, see *Pinus leiophylla.*

Pinus clausa (Engelm.) Vasey. **Sand pine.**
Range: 30.
Site: Dry, well-drained, sun.
Fruit: Cone; persistent, closed for 3 or 4 years.

A large evergreen tree; occurs commonly on poor sandy soil; wood of some importance locally for lumber; 74,000 seeds per pound.

Pinus contorta Loud. **Shore pine.**
Range: 1.
Site: Dry, well-drained, moist, sun.
Fruit: Cone; mature August–September of the second season; seeds shed at once or over a period of years; cones long, persistent.

A large shrub to commonly a small, or rarely, a large tree; two-needled; commonly occurs on sandy soil; close to the sea often forms dense, impenetrable thickets; 40,000–280,000 seeds per pound. Var. *bolanderi* Vasey is a canelike dwarf 2 to 5 feet high, with very small cones.

Observations: Of slight importance as browse for mule deer.

Pinus coulteri Don. **Coulter pine.**
Range: 4.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in August of the second season; seeds shed from October onward; cones persistent 5 or 6 years.

A large evergreen tree; three-needled; slow growing; wood rarely used except for fuel; 1,250 seeds per pound; vitality transient.

Observations: Of slight importance as browse for mule deer.

Pinus divaricata, see *Pinus banksiana.*

Pinus echinata Mill. **Shortleaf pine.**
P. mitis Michx.
Range: 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in September of the second season; persistent 2 or more years after ripening.

A large evergreen tree; commonly two-needled; occurs in sandy and other soils; forms a long taproot as a seedling and additional strong laterals later; grows poorly on lime or too rich soils; crowded out by loblolly pine on moist soils; growth rate at first rapid, later slower; fairly free from fungus and insect pests; fairly resistant to fire; stump sprouts but sprouts seldom develop merchantable trees; wood hard, resinous, much used commercially; 41,000–84,000 seeds per pound; germination 30–90 percent.

Stomach records: Three species of birds. *Observations:* Pine siskin, crossbill.

Pinus edulis Engelm. **Piñon.**
P. cembroides edulis Voss., *Caryopitys edulis* (Engelm.) Small.
Range: 9, 11, 13, 14, 16, 17.
Site: Dry, well-drained, sun.
Fruit: Cone; mature August–September; seeds shed September–October, cones soon falling.

A small to large evergreen tree; two- or sometimes three-needled; very resistant to drought in its natural habitat; very slow growing; wood soft, decaying rapidly; locally used for fuel and fence posts; 1,700 seeds per pound.

Stomach records: Nine species of birds, including Mearn's quail. *Observations:* Seven species[5] of birds, including Merriam turkey,[5] thick-billed parrot; porcupine, Hopi chipmunk,[5] Magdalena chipmunk,[5] cliff chipmunk,[5] rock squirrel,[5] New Mexico black bear, antelope ground squirrel,[5] mule deer;[5] much eaten by birds and mammals. Seeds eaten by livestock, especially goats.

Pinus flexilis James. **Limber pine.**
Apinus flexilis (James) Rydb.
Range: 4, 5, 11, 12, 13, 14, 15.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in September, seeds shed by the end of October, cones soon falling.

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[5] These records may refer to other species of piñon pines as well, since the animals were stated merely to be eating piñon nuts.

A large evergreen tree; five-needled; adapted to many kinds of soil; seedlings form large taproots; difficult to transplant; very intolerant of shade; susceptible to blister rust; most seed is produced by trees in open stands at low altitudes; long-lived; wood soft, of value commercially; 5,400–5,600 seeds per pound, germination 36 percent.

Stomach records: Two species of birds, including grouse. *Observations:* Porcupine, spruce squirrel, Fremont squirrel; much eaten by birds and squirrels generally.

Pinus glabra Walt. **Spruce pine.**

Range: 29, 30.
Site: well-drained, moist, sun, shade.
Fruit: Cone.

A large evergreen tree; two-needled; growth remarkably rapid; wood soft, of some value commercially; 77,500 seeds per pound.

Stomach records: Bobwhite, squirrel.

Pinus heterophylla, see *P. caribaea.*

Pinus jeffreyi Murr. **Jeffrey pine.**

P. ponderosa jeffreyi Vasey.
Range: 4.
Site: Well-drained, sun.
Fruit: Cone.

A large evergreen tree; three-needled; appears to intergrade with *P. ponderosa;* tolerant of shade in early stages, later intolerant; produces seed prolifically; wood of great commercial value; 3,100–3,300 seeds per pound; seeds from large cones complete their germination 2 weeks before seeds from small cones.

Stomach records: Four species of birds, including quail and Mount Pinos grouse. *Observations:* Clark's nutcracker; Columbian gray squirrel, Sierra chickaree, Tahoe chipmunk, Allen's chipmunk; commonly much eaten by birds and rodents; of slight importance as browse for mule deer.

Pinus lambertiana Dougl. **Sugar pine.**

Range: 1, 4, 10.
Site: Well-drained, sun.
Fruit: Cone; ripe in August of the second season, seeds shed in October, cones falling the following year.

A very large evergreen tree; largest of all pines; five-needled; susceptible to blister rust; very intolerant of shade except in the seedling stage; wood soft, of high commercial value; 2,300 seeds per pound, germination 65 percent.

Observations: Porcupine, Columbian gray fox, Sierra chickaree, Allen's chipmunk, long-eared chipmunk, California gray squirrel; of slight importance as browse for mule deer.

Pinus lasiocarpa, see *Abies lasiocarpa.*

Pinus leiophylla Schlecht. and Cham. **Chihuahua pine.**

P. chihuahuana Engelm., *P. leiophylla chihuahuana* Shaw.
Range: 11, 14.
Site: Dry, well-drained, moist, sun.
Fruit: Cone; mature in September of the third season, often persistent closed 5 or more years.

A large evergreen tree; commonly three-needled; intolerant of shade; wood of importance commercially but only a small supply is known.

Observations: Much eaten by thick-billed parrots.

Pinus mitis, see *Pinus echinata.*

Pinus monophylla Torr. and Frem. **Singleleaf piñon.**

P. cembroides monophylla Voss., *Caryopitys monophylla* (Torr. and Frem.) Rydb.
Range: 4, 5, 9, 10, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in August of the second season, seeds shed in September.

A small to large, flat-topped evergreen tree; commonly one-needled; very local in occurrence; endures extreme drought in its native habitat; very slow growing; intolerant of shade; wood much used for fuel locally; 1,200 seeds per pound.

Stomach records: Black-tailed deer. *Observations:* Seeds of great value generally for wildlife; of slight importance as browse for mule deer. Seeds are much used as food by Indians, and commonly eaten by livestock.

Pinus monticola Dougl. **Western white pine.**
Strobus monticola (Dougl.) Rydb.
Range: 1, 4, 12.
Site: Dry, well-drained, moist, sun.
Fruit: Cone; mature in September of the second season, seeds soon shed, cones soon falling.

A large evergreen tree; five-needled; seedlings with a large taproot, difficult to transplant; somewhat tolerant of shade in early stages, later intolerant; susceptible to blister rust; wood of great commercial value; most seed is produced by the dominant and codominant crown classes of trees; 14,000–29,000 seeds per pound, germination 18–44 percent; largest cones produce the best-quality seeds; in pure stands 2½ to 5 pounds of viable seed is produced per acre, in moderately good seed years; trees 70 to 100 years old produce a larger quantity of viable seed than older trees; seeds first borne by trees from 40 to 60 years of age; long-lived.

Observations: Say's chipmunk, porcupine; of slight importance as browse for mule deer.

Pinus muricata Don. **Bishop pine.**
Range: 1, 5.
Site: Dry, well-drained, moist, sun.
Fruit: Cone; mature in August of the second season, persistent closed for many years.

A large evergreen tree; two-needled; grows especially well in water-soaked sand but thrives also in dry soil; fairly tolerant of shade; an aggressive species; adaptable to many difficult positions; wood of value commercially; 18,000–60,000 seeds per pound.

Pinus murrayana Balf. **Lodgepole pine.**
P. contorta murrayana (Balf.) Engelm., *P. contorta latifolia* Wats.
Range: 2, 4, 10, 12, 13, 14, 15.
Site: Dry, well-drained, moist, sun.
Fruit: Cone; mature August–September of the second season, seeds shed at once or over a period of years.

A small to large evergreen tree; two-needled; intolerant of shade; easily killed by fire; comparatively free from fungi; not wind-firm; root system shallow, or deep on well-drained, deep soil; susceptible to sunscald; 76,000–110,000 seeds per pound, germination 63 percent.

Stomach records: Sierra grouse; plains white-tailed deer. *Observations:* Three species of birds, including Franklin grouse; porcupine, Sierra chickaree, Fremont pine squirrel, red squirrel, Yosemite cony; western chipmunk; an important browse of deer and elk in the northern Rocky Mountains.

Pinus palustris, see also *Pinus australis.*

Pinus palustris Mill. **Swamp pine.**
Range: 29, 30.
Site: Moist, sun.
Fruit: Cone.

A large evergreen tree; two-needled; grows particularly well near the sea; 4,000–8,000 seeds per pound, germination 46–87 percent. See *P. australis* for what has heretofor been known as the longleaf pine.

Pinus parryana Engelm. **Parry piñon.**
P. cembroides parryana Voss., *P. quadrifolia* Parry.
Range: 5, 10.
Site: Dry, well-drained, sun.
Fruit: Cone; ripe in August of the second season, seeds shed before the middle of September.

A small to large evergreen tree; commonly four-needled; slow growing; somewhat tolerant of shade in the early stages; wood without commercial value.

Observations: Seeds much eaten by birds and squirrels.

Pinus ponderosa Laws. **Western yellow pine.**
Range: 4.
Site: Dry, well-drained, sun.
Fruit: Cone; ripe August–September of the second season, seeds soon shed, cones soon falling.

A large evergreen tree; three-needled; wood of great commercial value.
Stomach records: Seven species of birds including California quail. *Observations:* Four species of birds including sooty grouse; porcupine, Columbian gray squirrel, Sierra chickaree, California gray squirrel; of outstanding importance as browse for mule deer. (Records of utilization of this species may apply partially to P. *brachyptera.*)

Pinus pungens Lam. **Mountain pine.**
Range: 25, 27.
Site: Dry, well-drained, sun.
Fruit: Cone; seeds shed in autumn of the second season or within 2 or 3 years, cones persistent 18 to 20 years but seeds often sterile with age.

A large evergreen tree; two-needled; rather slow growing; intolerant of shade; bears seed when 5 years old; often occurs on dry, gravelly slopes but grows also in moist clay; aggressive in old fields; 40,500 seeds per pound, germination 60–90 percent.

Pinus quadrifolia, see *Pinus parryana.*

Pinus radiata Don. **Monterey pine.**
Range: 1, 5.
Site: Well-drained, sun.
Fruit: Cone; mature in August of the second season, persistent closed 6 to 10 years, opening when heated.

A large, often flat-topped evergreen tree; three-needled; occurs naturally in only a few scattered colonies; short-lived in arid situations; does not thrive in wet soils; rapid growing; somewhat tolerant of shade; prolific annual seeder; wood little used because scarce; humus from the species accumulates rapidly; tolerant of saline conditions; 20,000 seeds per pound.
Stomach records: Two species of birds.

Pinus remorata Mason. **Santa Cruz Island pine.**
P. radiata binata Lemmon.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Cone.

A large evergreen tree; two-needled.

Pinus resinosa Ait. **Red pine.**
Range: 23, 24, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Cone; ripe in September, seeds soon shed, cones falling the next spring.

A large evergreen tree; two-needled; rapid growing; intolerant of shade; withstands severe cold and drought; resistant to fire; much more resistant to insects and diseases than white pine; rarely seeds abundantly; typical of, but not restricted to sandy soils; prunes itself early in close stands; wood not durable in soil, much used commercially; 30,000–69,000 seeds per pound, germination 50–87 percent; easily transplanted.
Stomach records: One species of bird. *Observations:* Cottontail rabbit.

Pinus rigida Mill. **Pitch pine.**
Range: 26, 27.
Site: Dry, well-drained, moist, sun.
Fruit: Cone; mature the second season, opening slowly, persistent several years.

A large evergreen tree; three-needled; grows in dry, rocky, sandy, and other sterile soils; coppices when cut; rapid growing when established; extremely resistant to fire; wood somewhat used commercially; 35,000–73,000 seeds per pound, germination 70 percent.
Stomach records: Three species of birds including ruffed grouse; white-tailed deer. *Observations:* Seven species of birds; a preferred food of red squirrels.

Pinus sabiniana Dougl. **Digger pine.**
Range: 4.
Site: Dry, well-drained, moist, sun.
Fruit: Cone; mature in September of the second season, seeds shed during several years, cones persistent several years longer.

A large evergreen tree; three-needled; rapid growing, especially in moist soil; extremely drought resistant; scarcely resistant to fire; seedlings, but not older trees, tolerant of shade; susceptible to fungus attack; wood of little commercial value, easily decaying; vitality of seeds transient.

Observations: California gray squirrel; of slight importance as browse for mule deer.

Pinus scopulorum, see *Pinus brachyptera.*

Pinus serotina Michx. **Pond pine.**
P. rigida serotina (Michx.) Loud.
Range: 28, 29, 30.
Site: Moist, sun.
Fruit: Cone; some open, some remain closed after maturity.

A large evergreen tree; commonly three-needled; rapid growing; intolerant of shade; wood heavy, resinous; 56,000 seeds per pound, germination 70–90 percent.

Stomach records: Bobwhite.

Pinus strobiformis Engelm. **Mexican white pine.**
Range: 11, 14.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in September, seeds completely shed by the middle of October.

A large evergreen tree; five-needled; susceptible to blister rust; seedlings endure moderate shade; wood little used commercially; most seed produced at middle elevations; 2,700 seeds per pound.

Observations: Much eaten by birds and squirrels.

Pinus strobus L. **Northern white pine.**
Strobus weymouthiana Opiz., *S. strobus* (L.) Small.
Range: 21, 22, 23, 24, 27.
Site: Well-drained, moist, sun, shade.
Fruit: Cone; mature in July of the second season, seeds discharged in September.

A large evergreen tree; five-needled; root system small, shallow; successful on sandy soils; commonly attacked by white-pine weevil and blister rust; wood of great importance commercially; numerous varieties distinguished in cultivation; 25,000 seeds per pound, germination 67 percent.

Stomach records: Six species of birds, including bobwhite; white-tailed deer.

Observations: Eight species of birds; a preferred food of red squirrel; moose, snowshoe hare, cottontail rabbit, casually browsed by northern white-tailed deer.

Pinus taeda L. **Loblolly pine.**
Range: 19, 20, 22, 25, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Cone; opens slowly, seeds shed in late fall and winter, cones persist a year longer.

A large evergreen tree; three-needled; seedlings with a long taproot, older trees with a spreading root system; not commonly found on heavy clay or highly siliceous soils; rapid growing; tolerant of shade in earlier stages, later much less so; susceptible to diseases and insects; wood not durable, valuable commercially; invades and reforests abandoned fields very rapidly; 13,000–55,000 seeds per pound, germination 25–80 percent.

Stomach records: Eight species of birds, including bobwhite.

Pinus torreyana Carr. **Torrey pine.**
Range: 5.
Site: Well-drained, sun.
Fruit: Cone; mature in August of the third season, some seed shed in September, the rest remaining in the cone for several years.

A small to large evergreen tree; five-needled; often low, crooked, and sprawling in exposed situations; apparently intolerant of shade; wood of no importance commercially because scarce; slow growing; 657 seeds per pound, prolific annual seeder; the rarest and with the most restricted range of any American pine.

Pinus tuberculata, see *Pinus attenuata.*

Pinus venusta, see *Abies venusta.*

Pinus virginiana Mill. **Virginia pine.**
Range: 25, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in August of the second season, opening slowly, persistent up to 4 years.

A large evergreen tree; two-needled; may grow on poor, light, sandy soils, but thrives best on clay, loam, or sandy loam; slow growing; intolerant of shade; damage by insects slight; not subject to any fungus threatening widespread destruction; short-lived; abundant seeder; 62,000 seeds per pound, percentage of fertile seeds high; wood somewhat used commercially.

Stomach records: Six species of birds, including bobwhite; white-tailed deer. *Observations:* Six species of birds.

Piptolepis phillyreoides, see *Forestiera phillyreoides.*

Pistacia mexicana, see *Pistacia texana.*

Pistacia texana Swingle.
P. mexicana of auths., not H. B. K.
Range: 11, 17.
Site: Dry, well-drained, moist, sun.
Fruit: Dry drupe.

A large shrub to small or rarely large tree; dioecious; leaves semievergreen; commonly occurs on limestone soils; as old trunks die new ones sprout from the base; highly drought resistant; vigorously recuperative; highly intolerant of shade; root system deep-penetrating; largest trees often staminate, smaller ones pistillate; seed commonly without an embryo when fruit is ripe. Leaves commonly eaten by goats.

Pitavia dumosa, see *Cneoridium dumosum.*

Pithecolobium brevifolium Benth. **Huajillo.**
Havardia brevifolia (Benth.) Small, *H. pallens* (Benth.) Britt. and Rose, *Zygia brevifolia* Sudw.
Range: 17.
Site: Well-drained, sun.
Fruit: Legume, available July–August.

A small to large spiny evergreen tree; commonly occurs in rich soils; thicket forming.

Of some importance as winter browse for sheep and goats.

Pithecolobium flexicaule (Benth.) Coult. **Texas-ebony.**
Acacia flexicaulis Benth., *Siderocarpos flexicaulis* (Benth.) Small, *Zygia flexicaulis* Sudw., *Ebenopsis flexicaulis* (Benth.) Britt. and Rose, *Samanea flexicaulis* MacBr.
Range: 17.
Site: Dry, well-drained, sun.
Fruit: Legume; available in September, pods never shed.

A large shrub to large tree; evergreen; spiny; slow growing; wood very durable; locally used for fence posts; very ornamental in bloom; seeds eaten by natives.

Pityothamnus pygmaeus, see *Asimina pygmaea.*

Pityothamnus angustifolius, see *Asimina incana.*

Pityothamnus incanus, see *Asimina incana.*

Planera aquatica (Walt.) Gmel. **Planer-tree.**
Range: 20, 25, 29, 30.
Site: Moist, sun, shade.
Fruit: Dry, drupe, available April–May.

A small to large tree; fairly rapid growing, short-lived; wood not used commercially; somewhat cultivated; grows on many soils.

Stomach records: Four species of birds; composed 45.5 percent of food of 175 mallard ducks collected October–December in central Louisiana. *Observations:* Black duck; ring-neck duck; considered an important duck food; squirrels.

Platanus sp. **Sycamores.**
Observations (in addition to specific records): goldfinch, band-tailed pigeon.

Platanus occidentalis L. **Sycamore.**
Range: 16, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30.
Site: Moist, well-drained, sun.
Fruit: Achene; available in October, persistent through the winter.

A very large, spreading tree; root system shallow, wide spreading; rapid growing, long-lived; much decayed with age; grows on coal-stripped lands in Illinois; wood of importance commercially; 100,000–170,000 seeds per pound, germination 5–10 percent, slow.

Stomach records: Mallard. *Observations:* Four species of birds; white-tailed deer; somewhat eaten by muskrat.

Platanus racemosa Nutt. **California sycamore.**
Range: 3, 4, 5.
Site: Well-drained, moist, sun.
Fruit: Achene.

A large tree; somewhat tolerant of alkali; trunk commonly leaning, horizontal, or even prostrate; wood not durable.

Observations: Goldfinch; California mule deer.

Platanus wrightii Wats. **Arizona sycamore.**
Range: 10, 11.
Site: Well-drained, moist, sun.
Fruit: Achene.

A large tree.

Pluchea borealis, see *Pluchea sericea.*

Pluchea sericea (Nutt.) Cov. **Arrowwood.**
Polypappus sericeus Nutt., *Tessaria borealis* DC., *Pluchea borealis* Gray., *Berthelotia sericea* Rydb.
Range: 9, 10, 11.
Site: Well-drained, moist, sun.
Fruit: Achene.

A large, willowlike shrub; flowers November–June; often forms dense, pure stands.

Observations: California mule deer. Somewhat nibbled by cattle and horses.

Poliomintha incana (Torr.) Gray.
Hedeoma incana Torr.
Range: 9, 11.
Site: Dry, sun.
Fruit: Nutlet.

A small shrub; commonly occurs on sandy soil; will grow on gypsum deposits.

Polycodium caesium, see *Vaccinium caesium.*

Polycodium floridanum, see *Vaccinium caesium.*

Polycodium melanocarpum, see *Vaccinium melanocarpum.*

Polycodium neglectum, see *Vaccinium neglectum.*

Polycodium stamineum, see *Vaccinium stamineum.*

Polygala acanthoclada Gray. **Thorn polygala.**
Range: 9, 10.
Site: Dry, sun.
Fruit: Capsule.

A large, spiny, much-branched shrub; forms densely interwoven mounds. Not eaten by livestock.

Polypappus sericeus, see *Pluchea sericea.*

Poncirus trifoliata, see *Citrus trifoliata.*

Popanax, see *Acacia.*

Popanax schaffneri, see *Acacia tortuosa.*

Popanax tortuosa, see *Acacia tortuosa.*

Populus spp.

Commonly large dioecious trees; occur on neutral soils; ordinarily rapid growing and short-lived; most cottonwoods appear to be fairly tolerant of salinity, especially *P. fremontii.* Members of the genus are attacked by the Texas root rot caused by *Phymatotrichum omnivorum.*

Stomach records (in addition to specific records): Ten species of birds, including ruffed grouse, dusky grouse, California quail, valley quail, sharp-tailed grouse; composed 12.46 percent of winter food of eastern ruffed grouse in New York, and 8.8 percent of winter food for the entire northeastern United States; mountain sheep. *Observations* (in addition to specific records): Twelve species of birds including spruce grouse, Columbian sharp-tailed grouse, staple winter food of prairie sharp-tailed grouse; staple food of greater prairie chicken, northern sharp-tailed grouse, pinnated, gray, and ruffed grouse; important food of white-tailed deer; preferred food of snowshoe hare; porcupine; important food of Pacific coast beaver; Sonora deer, moose; cottontail rabbit; broad-tailed beaver; staple food of mule deer; favorite food of beavers, few other trees being cut where these are present. A chief source of propolis. Nearly all western species are palatable to livestock.

Populus acuminata Rydb. **Lanceleaf cottonwood.**
Range: 11, 12, 13, 14, 15, 16.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large tree; commonly occurs in sandy or rocky soils; wood used locally.

Populus alba L. **White poplar.**
Range: 6, 8, 9, 11, 22, 25, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A large tree; introduced from Eurasia and more or less naturalized in the regions indicated; much attacked by scale and canker in Indiana; many varieties in cultivation.

Populus angulata, see *Populus sargentii.*

Populus angustifolia James. **Narrowleaf cottonwood.**
Range: 6, 8, 9, 11, 12, 13, 14, 15 (Black Hills).
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large, rapid-growing tree; wood used locally.

Populus arizonica Sarg. **Arizona cottonwood.**
P. mexicana of Amer. auths., not Westm.
Range: 10, 11, 14.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large, rapid-growing, short-lived tree; wood much used locally.
Observations: Beaver.

Populus aurea, see *Populus tremuloides.*

Populus balsamifera L. **Balsam poplar.**
P. tacamahaca Mill., *P. candicans* Michx.
Range: 12, 13, 15, 18, 21, 23, 24, 25, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Capsule, available May–June.

A large tree; commonly occurs in any wet soil; root system deep, spreading; rapid growing, somewhat short-lived; wood used commercially; vitality of seeds transient; germination percentage of seeds low. The much planted Carolina poplar is believed to be a hybrid between this and *P. nigra* L.
Stomach records: Stone caribou. *Observations:* Ruffed grouse.

Populus besseyana Dode.
Range: 8, 12, 15.
Site: Well-drained, sun.
Fruit: Capsule.

A large tree.

Populus candicans, see *Populus balsamifera.*

Populus cercidiphylla, see *Populus tremuloides.*

Populus deltoides Marsh. **Eastern cottonwood.**
P. virginiana Fourq.
Range: 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained moist, sun.
Fruit: Capsule available May–June.

A large tree; commonly occurs in rich soil; root system shallow, widespreading; appears to thrive in any moist soil; very rapid growing, short-

lived; easily damaged by fire when young, less so with age; much attacked by fungi; easily storm damaged; fairly wind-firm; 1,300,000 seeds per pound, germination 60–90 percent, vitality transient; stump sprouts and root sprouts produced; has been successfully used in checking erosion and in fixation of sand dunes; wood used commercially; grows on coal-stripped lands in Illinois.
Stomach records: Black-tailed deer. *Observations:* Evening, and rose-breasted grosbeak; cottontail rabbit. Much browsed by cattle.

Populus fremontii Wats. **Fremont cottonwood.**
P. macdougalii Rose.
Range: 1, 3, 4, 5, 9, 10, 11, 13, 14.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large tree; commonly occurs in sandy soil; grows well in saline soils; rapid growing, short-lived; wood used locally; much attacked by mistletoe. Several varieties are described, all occurring within the range of the species.
Observations: California mule deer.

Populus grandidentata Michx. **Largetooth aspen.**
Range: 21, 22, 23, 25, 26, 27, 28.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule, available in May.
A small to large tree; grows in sand, humus or loam; root system shallow; very rapid growing, short-lived; often severely injured by fungi, fire, wind, and insects; wood used commercially; a pioneer in burned and cut-over land; germination percentage of seeds high, vitality transient.
Observations: Cottontail rabbit, white-tailed deer.

Populus heterophylla L. **Swamp cottonwood.**
Range: 25, 27, 28, 29, 30.
Site: Moist, sun.
Fruit: Capsule, available in May.
A large tree; root system very shallow; rapid growing, short-lived; subject to heart rot at maturity; wood of importance commercially.

Populus macdougalii, see *Populus fremontii.*

Populus mexicana, see *Populus arizonica.*

Populus occidentalis, see *Populus sargentii.*

Populus palmeri Sarg. **Palmer cottonwood.**
Range: 16, 20.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large tree.

Populus sargentii Dode. **Sargent cottonwood.**
P. deltoides occidentalis Rydb., *P. occidentalis* (Rydb.) Britt., *P. angulata* Port. and Coult.
Range: 12, 13, 14, 15, 16, 18, 19, 21.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large tree; rapid growing, short-lived; wood used to some extent locally.

Populus tacamahaca, see *Populus balsamifera.*

Populus texana Sarg. **Texas cottonwood.**
Range: 16.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large, short-lived, rapid-growing tree.

Populus tremuloides Michx. (pl. 24, *A*, *B*,). **Quaking aspen.**
P. aurea Tidest., *P. vancouveriana* Trel., *P. cercidiphylla* Britt.
Range: 1, 2, 4, 6, 7, 8, 9, 11, 12, 13, 14, 15, 18, 21, 22, 23, 24, 25, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Capsule, available May–June.
A small to large tree; occurs in many soils; apparently not satisfactory in pure plantations owing to insects and disease; root system shallow; will grow in many soils but apparently does best in sandy loam; very rapid growing, short-lived; easily and seriously damaged by fire, wind, fungi, and insects; wood

of importance commercially; root sprouts formed; seed vitality transient, much abortive; generally a transient species invading and quickly occupying burned and logged areas and soon giving way to other species; the shade of these trees is never dense in spite of the closeness of stands; frequently supports an understory of weeds.

Stomach records: Three species of birds, including ruffed grouse and sharp-tailed grouse; black-tailed deer, northern white-tailed deer, mountain sheep, plains white-tailed deer; composed 3.2 percent of winter food of northern sharp-tailed grouse in Quebec and Ontario. *Observations:* Highly palatable to captive deer; pika; mountain beaver; white-tailed deer; important food of snowshoe hare; important browse of moose; important food of Pacific coast and Shasta beaver; of outstanding importance as browse for mule deer; red squirrel; the principal food of beaver throughout its range; black bear, cottontail rabbit, porcupine. Frequently supports understories of weeds and browse highly esteemed by livestock. Very palatable to sheep and goats.

Populus trichocarpa Torr. and Gray. **Black cottonwood.**
Range: 1, 2, 3, 4, 5, 6, 7, 8, 12, 13.
Site: Moist, sun.
Fruit: Capsule.

A large tree; commonly occurs in sandy humus or gravel; root system shallow; very rapid growing, longest-lived of the poplars although comparatively short-lived; storm-damaged, not wind-firm; wood of importance commercially, especially for pulp; seed with a high percentage germination, vitality transient.

Stomach records: Ruffed grouse.

Populus tweedyi Britt. **Tweedy cottonwood.**
Range: 9.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small to large tree.

Populus vancouveriana, see *Populus tremuloides.*

Populus virginiana, see *Populus deltoides.*

Populus wislizenii (Wats.) Sarg. **Valley cottonwood.**
P. fremontii wislizenii Wats.
Range: 11, 17.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large tree; commonly occurs in sandy soil; rapid growing in moist situations, slow in intermittently moist situations; short-lived, much cultivated throughout New Mexico; wood used locally, especially for fence posts. Eaten by cattle.

Porlieria angustifolia (Engelm.) Gray. **Soap-bush.**
Guiacum angustifolium Engelm.
Range: 11, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A large shrub to small tree; evergreen; branches rigid, spreading or straggling; wood very durable, used locally for fence posts. An important honey plant.

Potentilla fruticosa L. **Shrubby cinquefoil.**
Dasiphora fruticosa (L.) Rydb.
Range: 4, 12, 13, 14, 15, 18, 21, 22, 23, 24, 25, 26, 27, 28.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Achene.

A small evergreen shrub; flowers June–September; often sprawling; much branched; an aggressive species commonly invading pastures in New England, but plowing and close pasturing have successfully checked its spread; some 14 varieties are in cultivation.

Observations: Rarely browsed by moose; casually browsed by northern white-tailed deer. Considered inferior forage for cattle, but of importance for sheep and goats in the Southwest.

Prinos coriacea, see *Ilex coriacea.*

Prosopis spp. **Mesquites.**
Stomach records (in addition to specific records) : Scaled quail, antelope jack rabbit, gray-sided jack rabbit; Texas jack rabbit, Arizona cottontail, Holzner cottontail. *Observations* (in addition to specific records) : Gambel quail, Mexican turkey, white-winged dove.

Prosopis articulata, see *Prosopis chilensis.*

Prosopis chilensis (Mol.) Stuntz. **Mesquite.**
P. juliflora (Swartz) DC., *P. velutina* Woot., *P. juliflora velutina* (Woot.) Sarg., *P. odorata* Torr., *P. articulata* Wats., *P. glandulosa* Torr., *P. juliflora glandulosa* (Torr.) Cockerell, *Neltuma juliflora* (Swartz) Raf., *N. glandulosa* (Torr.) Britt. and Rose, *N. velutina* (Woot.) Britt. and Rose.
Range: 9, 11, 16, 17, 19, 20, 25, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Legume; available September–October, rarely July.

A large, spiny shrub to a small or rarely large tree; adapted to a wide range of soil conditions; seedling with a taproot but mature plant with a generalized root system; roots penetrate as much as 60 feet below the surface and 30 feet is common; little damaged by insects or disease; much used locally for fuel; thicket forming; shrubby in dry areas, larger and treelike in moist places; wood very hard and durable, often used for fence posts; underground stems enormous, locally an important source of fuel; commonly attacked by mistletoe; aggressive, apparently taking possession of grasslands, particularly when they are overgrazed; nearly impossible to kill by overgrazing; usually widespreading and lower when heavily grazed.

Standley (*539*) points out that in Mexico so many intergrading forms occur that separation of *P. chilensis* into three or more species is impossible. He notes that specimens from Peru and Argentina, if labeled from the United States, would be determined by a botanist as *P. juliflora.* (In an appendix he changes this name to *P. chilensis*). The variability of the species permits of many different forms, but from studies made by Standley of specimens from many localities, it would seem most useful to consider all forms as one species.

Stomach records: Five species of birds including scaled quail and Gambel quail; Mearn's coyote, northern hooded skunk; composed 36 percent of food of antelope jack rabbit, and 56 percent of food of Arizona jack rabbit throughout the year in Arizona.

Forage value for stock high; occasionally poisonous to stock if eaten to the exclusion of other forage; seeds pass out of the digestive tract of livestock unharmed, and in this condition are often eaten by birds, especially Gambel quail. An exceptionally good honey plant. *Observations:* Scaled quail; western white-winged dove; captive porcupine (pods only) ; Texas antelope squirrel; gray-tailed antelope squirrel; Harris ground squirrel; gray-spotted ground squirrel; Rio Grande ground squirrel; Mexican raccoon; coyote; Texas white-tailed deer; mule deer; rock squirrel. Far surpasses any other species in both frequency of occurrence and quantity taken in the food of Gambel quail; the buds and flowers are taken in spring, and in fall and winter seeds are eaten; these quail often use the rachides of the leaves in nest-building.

A host for the mistletoe (*Phoradendron californicum*) which produces an abundant and almost continuous crop of berries. Phainopeplas, mockingbirds, sage thrashers, robins, and bluebirds depend almost wholly on these berries for food; they are also eaten by Gambel quail. The Abert towhee, Crissal thrasher, phainopepla, and Lucy warbler commonly breed in the mesquite association.

Prosopis cinerascens Gray. **Screwbean.**
Strombocarpa cinerascens Gray.
Range: 11, 17.
Site: Dry, sun.
Fruit: Legume.

A small, spiny shrub.

Prosopis glandulosa, see *Prosopis chilensis.*

Prosopis juliflora, see *Prosopis chilensis.*

Prosopis odorata, see *Prosopis chilensis.*

Prosopis pubescens Benth. **Screwpod mesquite.**
Range: 9, 10, 11, 17.
Site: Dry, well-drained, moist, sun.
Fruit: Legume, available July–October.

A large shrub to small or large tree; spiny; occurs in sandy loam, gravel, and other soils; has a tendency to grow in thickets; wood very durable in contact with the soil, of importance locally.

Stomach records: Masked bobwhite, road runner, Gambel quail. Much browsed by livestock, and pods used for fodder.

Prosopis velutina, see *Prosopis chilensis.*

Prunus spp. **Cherries, plums.**

Trees or shrubs commonly divided into two classes, the cherries and the plums; most species are in general rather easily damaged by fire; constant cropping of the twigs leads to much suckering in the plums, which in turn saps the vitality of the root system.

Considerable discussion, in print and out, has resulted in causing the genus to be regarded with suspicion, as far as the poisonous qualities of some species are concerned. The statement that leaves in a wilting condition are poisonous is common. This may be a fallacy in view of work done at the New Hampshire Agricultural Experiment Station (*Dayton, 158*). However, parts of the plants contain varying quantities of amygdalin, a glucoside which, with the proper enzyme, yields hydrocyanic acid. The glucoside is present in leaves, bark, and especially in the seed, but never in the fruit pulp. In the eastern chokecherries the young vigorous leaves and tenderest shoots develop most of the cyanogenetic materials, and therefore in that region cattle should not be permitted to graze too early in the season in pastures where cherry is growing and should never be permitted to gorge themselves upon it. Hungry sheep should never be driven along trails lined with cherries. The pits, which are most poisonous, are never eaten by livestock. Birds, rodents, and other mammals are fond of the fruits and are considered to be largely responsible for the dissemination of the species.

Stomach records (in addition to specific records): Sixty-nine species of birds, including ruffed grouse, bobwhite, dusky grouse, sharp-tailed grouse, and ring-necked pheasant; composed 8.8 percent of winter food of ruffed grouse in New York, and 9.8 percent of winter food of ruffed grouse for the northeastern United States; red squirrel, gray eastern chipmunk, red fox, white-tailed deer; found in 71 skunk stomachs in New York; composed 6 percent of fruit food of eastern skunk in Michigan. *Observations* (in addition to specific records): Thirty-two species of birds, including band-tailed pigeon, Gambel quail, dusky, gray ruffed, and ruffed grouse, emergency food of northern sharp-tailed grouse; ranks nineteenth on the list of quail food plants of the Southeast; ring-necked pheasant; coyote, Say chipmunk, opossum, Douglas ground squirrel, raccoon, pica, and red fox, porcupine, Olympic wapiti, Wasatch chipmunk, Siskiyou chipmunk, rock squirrel; New Mexico black bear, Say's ground squirrel. Browse value on sheep and cattle range is considerable, although most species do not resist overgrazing well.

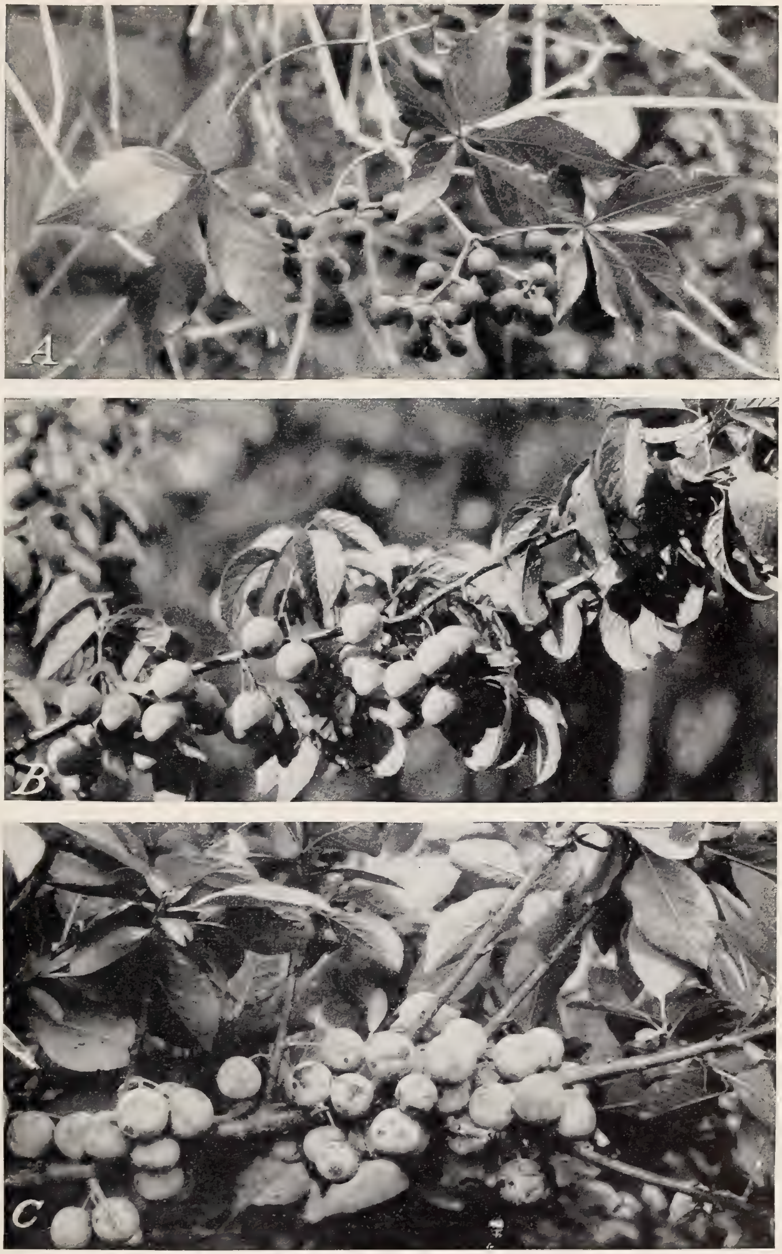
Prunus alabamensis Mohr. **Alabama cherry.**
Padus alabamensis Small.
Range: 27.
Site: Well-drained, sun.
Fruit: Drupe, available September–October.

A large shrub to small or large tree; flowers in May.

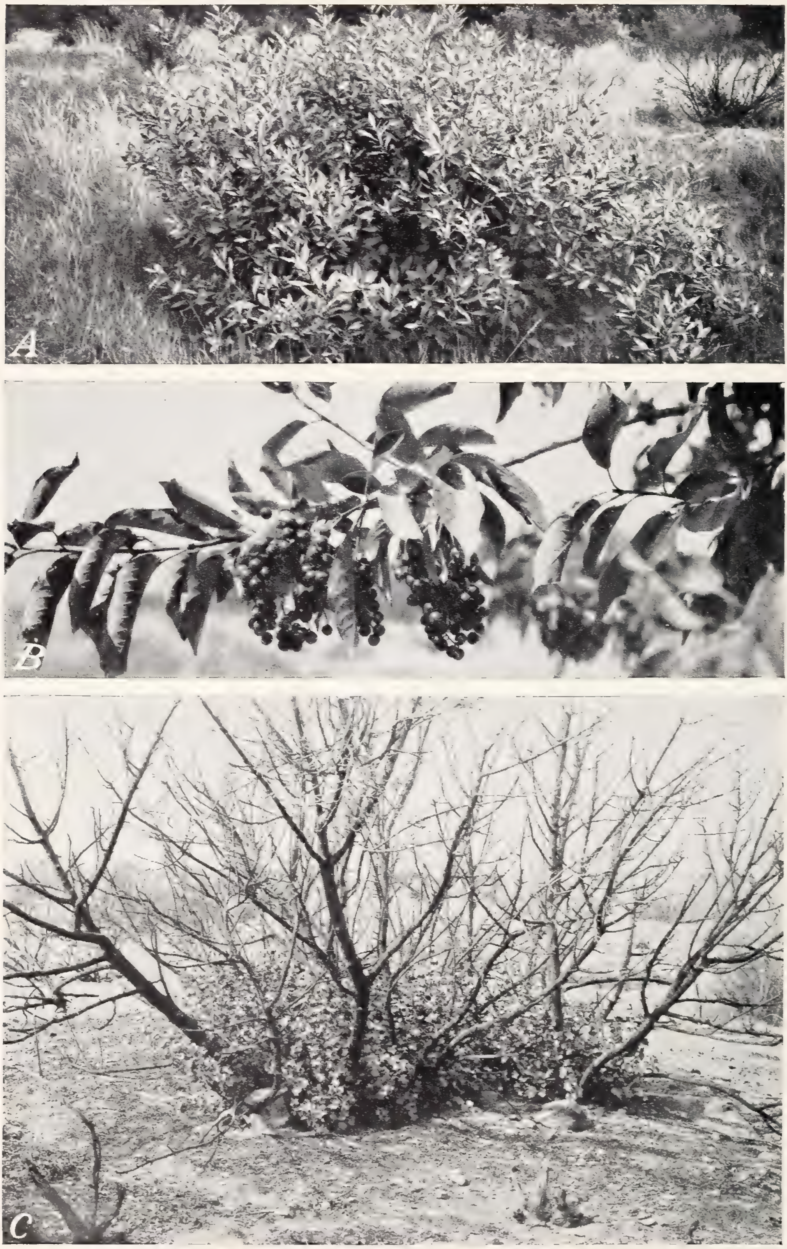
Prunus alleghaniensis Porter. **Allegheny plum.**
Range: 27.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available July–August.

A small to large shrub or small tree; flowers in April, commonly straggling; thicket forming; flowers and fruit borne profusely; sprouts readily from injured or exposed roots.

Prunus americana Marsh. (pl. 25, *B*). **Wild plum.**
Range: 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe, available July–October.



A, *Parthenocissus quinquefolia*. Along fence rows and as a cover for steep banks, the Virginia creeper should find much use. Its fruits are much sought after, especially by birds. *B*, *Prunus americana*. This plum and its close relatives are of outstanding merit in controlling erosion on poor sites. Its value as cover for wildlife is equally great. *C*, *P. maritima*. Although a native on sandy soil, the beach plum has been successfully used on poor clay soil. It forms an excellent cover both for soil and wildlife, and produces an abundant crop of fruit.



A, *Prunus besseyi*. A specimen in a garden where maximum development of the bushy habit indicates possibilities for soil and wildlife-cover planting. *B*, *P. demissa*. The fruit of the western chokecherry is of considerable value for wildlife. In planting it for erosion control care must be taken to guard against possible stock poisoning. *C*, *P. ilicifolia*. The ability of the hollyleaf cherry to coppice after killing of its aerial portions enhances its erosion-control value. (Photograph by U. S. Forest Service.)

A large, spiny shrub to small or rarely large tree; flowers April–May; thicket forming; about 316 named varieties are known, the best-fruited types occurring in the Middle West; commonly sprouts from the roots to form extensive colonies; 800–1,500 seeds per pound.

Stomach records: Pine grosbeak. *Observations:* Prairie sharp-tailed grouse, ring-necked pheasant; leaves refused by captive marsh rabbits; much eaten by many kinds of birds.

Prunus andersonii Gray. **Desert peach.**

Emplectocladus andersonii (Gray) Nels. and Ken., *Amygdalus andersonii* (Gray) Greene.

Range: 4, 9.
Site: Dry, well-drained, sun.
Fruit. Drupe.

A small to large shrub or small tree; flowers in May; thorny, spreading; occurs on gravelly, sandy, or other soils; extremely drought resistant; taproot well developed; thicket forming.

Considered fair to good sheep and goat browse and only slightly inferior for cattle.

Prunus angustifolia Marsh. **Chickasaw plum.**

P. chicasa Michx.

Range: 20, 22, 25, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe, available May–August.

A large shrub to small or large tree; flowers March–April; somewhat thorny; densely thicket forming; commonly occurs in sandy soil; 800–1,000 seeds per pound.

Var. *watsonii* (Sarg.) Waugh, (*P. watsonii* Sarg.) is a dwarf occurring in regions 17 and 19.

Prunus arkansana, see *Prunus mexicana.*

Prunus australis, see also *Prunus mexicana.*

Prunus australis Beadle. **Southern wild cherry.**

Padus australis Small.

Range: 29.
Site: Well-drained, sun.
Fruit: Drupe, available July–August.

A small to large tree; flowers in April; occurs on clay soil.

Prunus avium L. **Sweet cherry.**

Range: 27, 28.
Site: Dry, well-drained, sun.
Fruit: Drupe, available in July.

A small to large tree; flowers April–May; introduced from Eurasia and more or less naturalized in the regions indicated; wood used commercially.

Stomach records: Nine species of birds; red squirrel.

Prunus besseyi Bailey (pl. 26, *A*). **Western sand cherry.**

P. prunella Daniels, *P. pumila besseyi* (Bailey) Waugh.

Range: 15, 16, 18, 19, 23.
Site: Well-drained, sun.
Fruit: Drupe.

A small, bushy shrub; flowers April–May; more or less prostrate; sprouting from roots but rarely forming thickets; occurs on sandy and other soils; 4,000 seeds per pound; fruit produced the second or third year from seed; large-fruited varieties are known.

Observations: Ring-necked pheasant. Poisonous to livestock.

Prunus borealis, see *Prunus nigra.*

Prunus capollin, see *Prunus serotina.*

Prunus capuli, see *Prunus serotina.*

Prunus caroliniana Ait. **Laurel cherry.**
P. sempervirens Willd., *Laurocerasus caroliniana* (Mill.) Roem., *Padus caroliniana* Mill., *Cerasus caroliniana* Michx.
Range: 20, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe, persistent the year round.

A large shrub to small or large tree; evergreen; flowers February–April; rapid growing; thicket forming.

Observations: Three species of birds. Leaves poisonous to livestock.

Prunus cerasus L. **Sour cherry.**
Range: 22, 25, 27.
Site: Dry, well-drained, sun.
Fruit: Drupe, available June–July.

A small to large tree; flowers April–May; introduced from southern Europe and more or less naturalized in the regions indicated.

Stomach records: Three species of birds, including bobwhite. *Observations:* Seven species of birds.

Prunus chicasa, see *Prunus angustifolia.*

Prunus corymbulosa Rydb. **Rocky Mountain red cherry.**
P. pennsylvanica corymbulosa (Rydb.) Wight, *Cerasus trichopetala* Greene.
Range: 12.
Site: Dry, sun.
Fruit: Drupe.

A small to large shrub; flowers May–June; commonly occurs in stony places.

Prunus cuneata, see *Prunus susquehanae.*

Prunus cuthbertii Small. **Cuthbert cherry.**
Padus cuthbertii Small.
Range: 28.
Site: Well-drained, moist, sun.
Fruit: Drupe, available July–August.

A large shrub to small tree.

Prunus demissa (Nutt.) Walp. (pl. 26, *B*). **Western chokecherry.**
P. virginiana demissa Sarg., *Cerasus demissa* Nutt., *Padus demissa* Roem.
Range: 1, 2, 4, 6, 7, 9, 12, 13, 14, 15, 16, 18, 21.
Site: Dry. well-drained, moist, sun.
Fruit: Drupe, available July–October.

A large shrub to small tree; flowers April–May; thicket forming.

Var. *melanocarpa* Nels. (*Padus melanocarpa* (Nels.) Shaf., *Prunus melanocarpa* (Nels.) Rydb.), the black western chokecherry, occurs with the species; thicket forming; spreads by rhizomes; root system shallow with occasional deep-feeding roots; 3,000–5,000 seeds per pound.

Stomach records: Six species of birds; black-tailed deer, plains white-tailed deer. *Observations:* Three species of birds, including ring-necked pheasant, sharp-tailed grouse; of outstanding importance as browse for mule deer; pica; eaten avidly by many birds. Commonly lightly to moderately browsed by stock; overgrazing of this species commonly leads to poisoning, notably in the spring; not harmful in the fall.

Prunus depressa, see *Prunus pumila.*

Prunus emarginata (Dougl.) Walp. **Bitter cherry.**
Cerasus emarginata Dougl., *C. glandulosa* Kellogg., *C. californica* Greene, *C. crenulata* Greene, *C. arida* Greene, *C. rhamnoides* Greene, *C. kelloggiana* Greene, *C. padifolia* Greene, *C. obliqua* Greene, *C. parvifolia* Greene, *C. obtusata* Greene.
Range: 1, 2, 4, 6, 8, 9, 10, 11, 12, 13, 14.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available May–September.

A large shrub to small or large tree; flowers April–May; densely thicket forming; flowers and fruit appear earliest near the Coast.

Var. *villosa* Sudw., (*P. mollis* Walp., *P. emarginata mollis* Brew., *Cerasus prunifolia* Greene, *P. prunifolia* (Greene) Shaf.), the plumleaf cherry, occurs within the range of the species.

Stomach records: Six species of birds, including ruffed grouse; Mono chipmunk. *Observations:* Of outstanding importance as browse for mule deer; much eaten by Allen's chipmunk; alpine chipmunk. Of most value as stock forage toward the end of the season; has been frequently claimed to be poisonous, but probably because it has been confused with the chokecherries.

Prunus eriogyna Mason. **Desert apricot.**
P. fremontii Wats., *Amygdalus fremontii* (Wats.) Abrams.
Range: 5, 10.
Site: Dry, sun.
Fruit: Drupe, available in May.

A large, spiny shrub; flowers February–March; heat and drought resistant; germination of seed rapid, from 8 to 10 days after planting. Furnishes a small amount of forage for sheep and goats.

Prunus eximia Small.
Padus eximia Small.
Range: 17.
Site: Well-drained, sun.
Fruit: Drupe.

A large tree.

Prunus fasciculata Gray. **Desert almond.**
Emplectocladus fasciculatus Torr., *Lycium spencerae* MacBr., *Amygdalus fasciculata* Gray.
Range: 3, 5, 9, 10, 11, 13.
Site: Dry, sun.
Fruit: Drupe, available April–May.

A small to large shrub or small tree; dioecious, thorny; occurs in gravelly and sandy soil; densely branched; forms dense thickets. Furnishes some browse for sheep and goats.

Prunus fremontii, see *Prunus eriogyna.*

Prunus fultonensis, see *Prunus mexicana.*

Prunus glandulosa, see *Prunus texana.*

Prunus gracilis Engelm. and Gray. **Oklahoma plum.**
P. normalis Rydb., *P. normalis* Small, *P. chicasa normalis* Torr. and Gray.
Range: 16, 22, 25.
Site: Dry, sun.
Fruit: Drupe, available June–August.

A small, straggling shrub; commonly occurs in sandy soil; thicket forming; especially susceptible to the black knot fungus.

Prunus havardii (Wight) Mason.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Drupe, available in July.

A large, rigidly-branched, spinescent shrub.

Prunus hookeri, see *Prunus texana.*

Prunus hortulana, see also *Prunus munsoniana.*

Prunus hortulana Bailey. **Wild goose plum.**
Range: 22, 25, 27, 29.
Site: Dry, well-drained, moist.
Fruit: Drupe, available July–October.

A large shrub to small or large tree; flowers April–May; commonly occurs in rich soils; does not produce suckers but often occurs in groves; fruit produced abundantly; 34 named varieties are known.

Prunus ilicifolia (Nutt.) Walp. (pl. 26, *C*). **Hollyleaf cherry.**
Range: 1, 3, 4, 5.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available October–December.

A large shrub to small or large tree; evergreen; foliage dense and compact; flowers March–May; occurs in sand, loam, clay, and other soils; clump forming;

casts a heavy shade; coppices vigorously after fire; tolerant of alkali; drought resistant; will withstand considerable abuse in handling; 240 seeds per pound.

Observations: Hairy woodpecker; eaten by songbirds; California mule deer.

Prunus incana, see *Prunus pumila.*

Prunus injucunda, see *Prunus mitis.*

Prunus integrifolia, see *Prunus lyonii.*

Prunus lanata (Sudw.) Mack and Bush. **Wild plum.**
P. americana lanata Sudw., *P. palmeri* Sarg.
Range: 22, 25, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe, available July–October.

A large shrub to small tree; thicket forming, suckering; 16 named varieties known.

Prunus lyonii (Eastw.) Sarg. (pl. 27, *A*). **Catalina cherry.**
P. ilicifolia integrifolia Sudw., *P. integrifolia* Sarg., not Walp., *P. ilicifolia occidentalis* Brandeg.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Drupe, available August–September.

A large shrub to small or large tree; evergreen; flowers March–June; more robust and rapid growing than *P. ilicifolia,* even when planted on the mainland; drought resistant.

Observations: Fruit much sought after by birds which commonly eat off the flesh and leave the seed hanging on the bush.

Prunus mahaleb L. **Mahaleb cherry.**
Cerasus mahaleb (L.) Mill.
Range: 22, 25, 27, 28.
Site: Dry, well-drained, sun.
Fruit: Drupe, available in July.

A large shrub to small tree; flowers April–May; introduced from Europe and more or less naturalized in the regions indicated.

Prunus maritima Wang. (pl. 25, *C*). **Beach plum.**
P. pygmaea Willd., *P. sphaerocarpa* Michx., *P. acuminata* Michx., *P. sphaerica* Willd., *P. pubescens* Pursh, *P. littoralis* Bigel., *P. pubigera* Steud.
Range: 26, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Drupe, available August–March.

A small to large, straggling shrub; flowers April–May; lower branches often decumbent or prostrate; more or less thorny; occurs only on sandy soils but will grow on clay.

Stomach records: Starling.

Prunus melanocarpa, see *Prunus demissa.*

Prunus mexicana Wats. **Mexican plum.**
P. australis Muns., *P. reticulata* Sarg., *P. tenuifolia* Sarg., *P. polyandra* Sarg., *P. arkansana* Sarg.
Range: 19, 20, 22, 25, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available September–November.

A small to large tree; flowers in March; does not sucker or form thickets; somewhat drought resistant; occasionally injured by frost; has been successfully used as grafting stock; numerous varieties occur within the range of the species.

Var. *fultonensis* Sarg. (*P. fultonensis* Sarg.), has fruits which ripen in June.

Prunus minutiflora Engelm. **Texas almond.**
Cerasus minutiflora (Engelm.) Gray, *Amygdalus minutiflora* (Engelm.) Wight.
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Drupe.

A small to large, intricately-branched, dioecious shrub; forms dense thickets; staminate plants much more numerous than pistillate plants in the field; probably occurs most commonly on limestone soil. Furnishes a small amount of browse for sheep and goats.

Prunus mitis Beadle. **Georgia sloe.**
P. injucunda Small, *P. umbellata injucunda* (Small) Sarg.
Range: 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe, available June–August.
A large shrub to small tree; occurs in sandy and other soils.

Prunus mollis, see *Prunus emarginata* and *P. nigra.*

Prunus munsoniana Wight and Hedr. **Wild goose plum.**
P. hortulana Bailey in part, *P. hortulana* Waugh, not Bailey.
Range: 20, 22, 25, 29.
Site: Well-drained, moist, sun.
Fruit: Drupe, available July–September.
A large shrub to small or large tree; flowers March–May; forms dense thickets; about 67 named varieties are known.

Prunus nana, see *Prunus virginiana.*

Prunus nigra Ait. **Canada plum.**
P. mollis Torr., *P. borealis* Poir., *P. americana nigra* Waugh, *Cerasus borealis* Michx., *C. nigra* Loisel.
Range: 21, 23, 24, 26, 27.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe, available August–October.
A large shrub to small tree; flowers in May; forms root sprouts; thicket forming; branches often spinescent; may occur on limestone soils; does not break or damage in severe snow and storms; about 20 named varieties are known.

Prunus normalis, see *Prunus gracilis.*

Prunus palmeri, see *Prunus lanata.*

Prunus pennsylvanica L.f. **Pin cherry.**
P. persicifolia Desf., *P. montana* Marsh., *P. lanceolata* Willd.
Range: 13, 15, 18, 21, 23, 24, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Drupe, available August–October.
A small to large tree; flowers April–June; root system shallow; rapid growing, short-lived; particularly bushy northward; thicket forming; occasionally seriously damaged by the cherry-leaf beetle; commonly a shrub on poor soils; occurs on many kinds of soil including sand; has been used as grafting stock for sour cherry; 8,000 seeds per pound.
Stomach records: Twenty-three species of birds, including ruffed grouse, bobwhite, ptarmigan, sharp-tailed grouse, ring-necked pheasant and greater prairie chicken; this and *P. serotina* composed 2.3 percent of winter food of northern sharp-tailed grouse in Quebec and Ontario; composed 0.64 percent of fall food of prairie chicken in Wisconsin; Lyster chipmunk, white-tailed deer; chipmunk. *Observations:* Five species of birds; an emergency food of prairie sharp-tailed grouse; cottontail rabbit, moose; of importance as food for beaver where *Populus* is lacking. Poisonous to livestock.

Prunus prunella, see *Prunus besseyi.*

Prunus prunifolia, see *Prunus emarginata.*

Prunus pumila L. **Sand cherry.**
P. depressa Pursh, *P. incana* Schwein., *Cerasus canadensis* Mill. *C. glauca* Moench.
Range: 15, 18, 21, 23, 24, 26, 27, 28.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available June–August.
A small shrub; flowers April–May; spreading and creeping; commonly prostrate with growing branches erect; suckers abundantly produced where stems touch the ground; occurs commonly in sandy soil; 4,000 seeds per pound.
Observations: Three species of birds; casually browsed by northern white-tailed deer.

Prunus pygma, see *Prunus reverchonii.*

Prunus reverchonii Sarg.
P. pygma Muns. **Hog plum.**
Range: 16, 20.
Site: Well-drained, moist, sun.
Fruit: Drupe, available July–September.

A small to large shrub; flowers March–April; forms dense thickets; withstands severe drought; will grow on limestone soils.

Prunus rivularis Scheele. **Creek plum.**
P. texana Scheele, not Dietr.
Range: 17, 25, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Drupe, available in June.

A large shrub.

Prunus rufula, see *Prunus virens.*

Prunus salicifolia, see *Prunus serotina.*

Prunus sempervirens, see *Prunus caroliniana.*

Prunus serotina[6] Ehrh. **Black cherry.**
Range: 11, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available June–November.

A small to large tree; root system deep; wind-firm; much attacked by insects and fungi; easily injured by fire; wood of importance commercially; 4,000–5,000 seeds per pound, germination 70–90 percent.

Stomach records: Thirty-three species of birds, including ruffed grouse, bobwhite, and sharp-tailed grouse; composed 0.47 percent of fall food of prairie chicken in Wisconsin; this and *P. pennsylvanica* composed 2.3 percent of winter food of northern sharp-tailed grouse in Quebec and Ontario; white-tailed deer. *Observations:* Twenty-one species of birds including bobwhite, ring-necked pheasant; an important food of red fox; sixth most important preferred food of white-tailed deer in Massachusetts; raccoon; cottontail rabbit; squirrel; black bear.

The most poisonous species to livestock of all cherries.

Prunus subcordata Benth. **Pacific plum.**
P. subcordata kelloggii Lemmon.
Range: 2, 3, 4, 12.
Site: Dry, well-drained, sun.
Fruit: Drupe, available August–September.

A large shrub or rarely a small tree; flowers March–May; thicket forming; leaves commonly shed just before fruit is ripe; fruit commonly borne only every 2 years; in the central portion of its range the fruit often develops into a bladdery structure caused by a fungus; propagates not only by seed but by buds formed on the roots; occurs in sand, gravel, loam, and other soils.

Observations: Of fair importance as browse for mule deer. Heavily browsed by sheep; often killed by overgrazing.

Prunus susquehanae Willd. **Appalachian cherry.**
P. cuneata Raf., *P. pumila cuneata* (Raf.) Bailey.
Range: 23, 24, 26, 27, 28.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available July–August.

A small shrub; occurs in sandy and rocky barrens; roots long and stocky.

Stomach records: Prairie chicken.

Prunus tarda Sarg. **Texan sloe.**
P. umbellata tarda (Sarg.) Wight.
Range: 16, 17, 20, 29.
Site: Dry, well-drained, sun.
Fruit: Drupe, available October–November.

A small to large tree; flowers in April; often more or less thorny; flowers abundantly produced.

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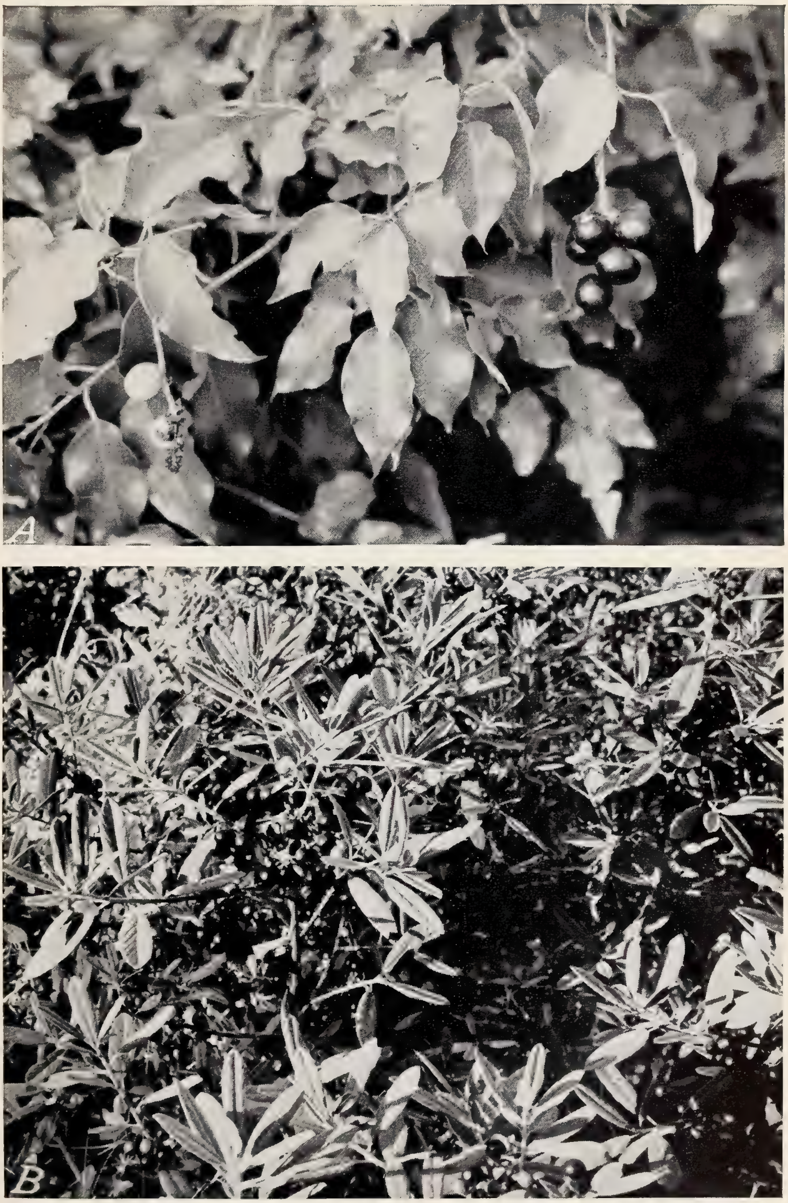
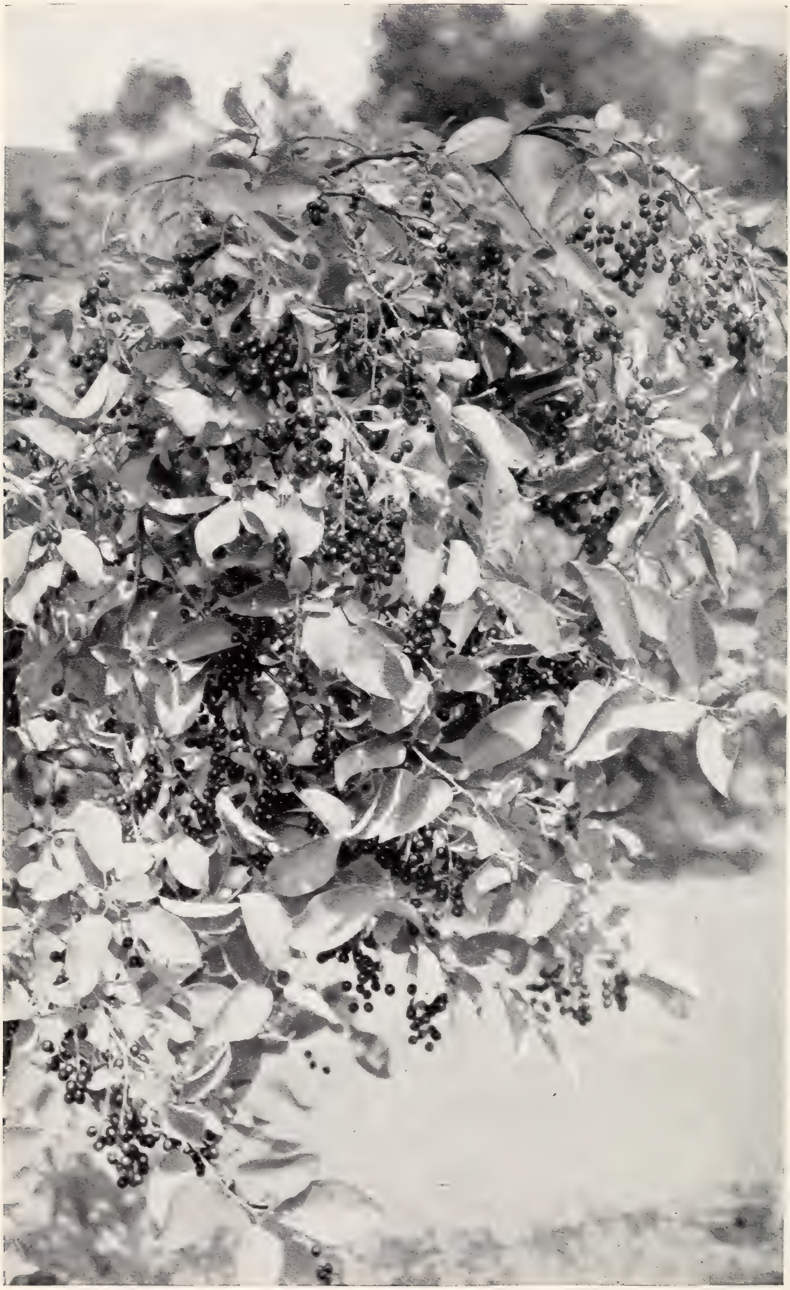
[6] Var. *salicifolia* (H. B. K.) Koehne, (*P. salicifolia* H. B. K., *P. capuli* Cav. *P. capollin* Koehne), is a Mexican species apparently outside the United States.



A, *Prunus lyonii*. The naked pits at the left have been stripped of their flesh by songbirds. The species is an excellent soil cover and should prove of great value in conservation plantings. *B*, *Rhamnus californica* var. *tomentella*. More robust and bushier than the species, this variety affords better cover for soil and wildlife. In the records of considerable utilization as wildlife food no distinction is made between the fruits of the variety and of the species.



Prunus virginiana. This thicket-forming, profusely fruiting cherry appears to have great value in a program involving soil and wildlife conservation. Its stock-poisoning character prevents any use of it except in fenced areas.

Prunus tenuifolia, see *Prunus mexicana.*

Prunus texana, see also *Prunus rivularis.*

Prunus texana Dietr. **Wild peach.**
P. glandulosa (Hook.) Torr. and Gray, *P. hookeri* Schneid., *Amygdalus glandulosa* Hook., *A. texana* (Dietr.) Wight.
Range: 17, 20, 29, 30.
Site: Well-drained, sun.
Fruit: Drupe, available April–May.

A small to large almost evergreen shrub; somewhat thorny; found on sand or sandy loam; apparently does not occur on limestone; root system deep; drought resistant. Furnishes a small amount of forage for sheep and goats.

Prunus umbellata Elliott. **Black sloe.**
Range: 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available July–September.

A small tree; occurs in sandy and other soils.

Prunus valida (Woot. and Standl.) Rydb.
Padus valida Woot. and Standl.
Range: 9, 14.
Site: Well-drained, sun.
Fruit: Drupe.

A small tree; flowers in June.

Prunus virens Shreve. **Southwestern black cherry.**
Padus virens Woot. and Standl.
Range: 10, 11, 14.
Site: Moist, sun.
Fruit: Drupe, available August–September.

A large shrub to small or large tree; more or less evergreen; flowers in May; fruit sometimes borne in great profusion; attempts to use this as grafting stock have been unsuccessful.

Var. *rufula* Sarg. (*P. rufula* Tidest., *Padus rufula* Woot. and Standl.) is more pubescent than the species.

Observations: Eagerly eaten by bears and other wild animals. Fair to good winter browse for livestock.

Prunus virginiana L. (pl. 28). **Choke cherry.**
P. nana (Du Roi) Roem., *Padus nana* Du Roi, *P. virginiana* (L.) Mill.
Range: 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe, available July–September.

A large shrub to small tree; forms dense thickets by sending out long roots which sprout at intervals; fruit abundantly produced; 3,000–5,000 seeds per pound.

Var. *pumicea* (Woot. and Standl.) Palmer, (*Padus pumicea* Woot. and Standl.) occurs in regions 11 and 14.

Stomach records: 31 species of birds including ruffed grouse, bob-white, ring-necked pheasant, sharp-tailed grouse, and greater prairie chicken. *Observations:* Fourteen species of birds including bobwhite, ring-necked pheasant, cottontail rabbit, black bear.

Prunus watsonii, see *Prunus angustifolia.*

Psedera heptaphylla, see *Parthenocissus heptaphylla.*

Psedera quinquefolia, see *Parthenocissus quinquefolia.*

Psedera vitacea, see *Parthenocissus vitacea.*

Pseudotsuga spp. **Douglas fir.**
Evergreen, monoecious trees of the greatest importance as timber.

Stomach records (in addition to specific records): Black-tailed deer. *Observations* (in addition to specific records): Spruce squirrel.

Pseudotsuga douglasii, see *Pseudotsuga taxifolia.*

Pseudotsuga glauca Mayr.[7] **Colorado Douglas fir.**
P. douglasii glauca Mayr.
Range: 9, 11, 13, 14, 16.
Site: Well-drained, sun.
Fruit: Cone, available September–October.

A large evergreen tree; resistant to winter cold; susceptible to spring frost; grows well on dry, sandy soil and moist loamy soil but not clay, gravel or poorly drained sites; slow growing; wood much less valuable commercially than that of *P. taxifolia;* does not pioneer in burns; shorter lived than *P. taxifolia.*

Stomach records: Richardson's grouse; plains white-tailed deer, black-tailed deer, mountain sheep. *Observations:* Captive sharp-tailed grouse, dusky grouse; red squirrel, chestnut-mantled ground squirrel, porcupine, bighorn.

Pseudotsuga macrocarpa (Torr.) Mayr. **Bigcone spruce.**
Range: 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Cone; mature in August, seeds shed August–September, some cones persistent the year round.

A large evergreen tree; slow growing; wood not used commercially; seed vitality low but persistent.

Observations: Seeds eaten by rodents and birds.

Pseudotsuga mucronata, see *Pseudotsuga taxifolia.*

Pseudotsuga taxifolia (Lam.) Britt. **Oregon Douglas fir.**
P. douglasii Carr., *P. mucronata* (Raf.) Sudw., *P. douglasii caesia* Schwerin.
Range: 1, 2, 3, 4, 5, 6.
Site: Well-drained, sun.
Fruit: Cone; mature September–October, seeds shed at once.

A very large evergreen tree; demands high relative humidity for best growth; cannot withstand severe cold or drying winds; grows best on well-drained, sandy loam; absent from poorly drained areas; growth rate rapid; an extremely important timber tree; often a pioneer in burns; much larger and longer lived tree than *P. glauca.* (See footnote under *P. glauca.*)

Var. *caesia* Schwerin is a form more or less intermediate between this species and *P. glauca;* it occurs in regions 6, 7, and 12; makes no summer growth and is slower growing than the species.

Observations: Dusky and Franklin grouse; browsed as a last resort by Olympic wapiti; porcupine; much eaten by Douglas squirrel, Sierra chickaree, red spruce squirrel, and Magdalena chipmunk; of slight importance as browse for mule deer.

Psilostrophe cooperi (Gray) Greene.
Riddelia cooperi Gray.
Range: 9, 10, 11.
Site: Dry, well-drained, sun.
Fruit: Achene.

A small, clump-forming shrub.

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[7] The separation of the Rocky Mountain from the western form of the Douglas fir has not commonly been made in this country, but there appears to be such a good basis for this separation, not only ecologically but taxonomically, that it is here made. Reference to Henry and Flood (*278*) and Frothingham (*204*) will show the following characteristics to separate the two species: *P. taxifolia*—(1) Rapid growing; (2) wide crown; (3) produces a second leading shoot in summer and this late growth makes it susceptible to injury by late frosts; (4) foliage more regularly disposed in two ranks, soft to touch; (5) leaves thin, under surface flat, no idioblasts present; (6) leaves contain geraniol, and, consequently, smell like pineapple; (7) young cones green to pink, bracts erect; (8) cones 3 to 4 inches long; (9) wood straight, light, durable, excellent timber; (10) torus of bordered pits centrally placed, wood readily permeated by creosote; (11) germination of seed poor; (12) attacked by *Chermes;* (13) growth rate twice that of the other species, timber yield 4 to 10 times that of the other; (14) will grow in England but not New England. *P. glauca*—(1) Less rapid growing; (2) crown narrow, compact, pyramidal; (3) does not produce a second leading shoot, growth completed early in the season, and, consequently, not susceptible to frost; (4) foliage less regularly disposed in two ranks; (5) leaves thick, under surface convex, idioblasts present; (6) leaves contain bornyl acetate and, consequently, smell like turpentine; (7) young cones brilliant red, bracts spreading and reflexed; (8) cones 2 to 3 inches long; (9) wood irregular in structure, strong and durable, rough timber; (10) torus of bordered pits pressed to one side, wood not readily permeated by creosote; (11) germination of seed much better and sooner than the other species; (12) not attacked by *Chermes;* (13) growth rate about half that of the other species, timber yield much less than that of the other species; (14) will not grow in England, but will grow in New England.

Psorodendron arborescens, see *Parosela arborescens.*

Psorodendron californicum, see *Parosela fremontii.*

Psorodendron fremontii, see *Parosela fremontii.*

Psorodendron johnsonii, see *Parosela fremontii.*

Psorodendron puberulum, see *Parosela schottii.*

Psorodendron schottii, see *Parosela schottii.*

Psorodendron spinosum, see *Parosela spinosa.*

Psorothamnus emoryi, see *Parosela emoryi.*

Psorothamnus polyadenia, see *Parosela polyadenia.*

Psorothamnus scoparius, see *Parosela scoparia.*

Psorothamnus subnudus, see *Parosela polyadenia.*

Ptelea spp.

The species of this genus are apparently not well understood at present. The reduction of all to two species is without doubt open to question but since authorities do not agree on what is to be done with the *P. trifoliata* complex, it is offered here as one species. None is eaten by livestock.

Ptelea angustifolia, see *Ptelea baldwinii.*

Ptelea baldwinii Torr. and Gray. **California hoptree.**
P. baldwinii crenulata Jeps., *P. crenulata* Greene, *P. angustifolia* Benth.
Range: 3, 5, 9, 17.
Site: Dry, well-drained, sun.
Fruit: Samara.

A large shrub to small tree; flowers April–May; about 7,000 seeds per pound.

Ptelea crenulata, see *Ptelea baldwinii.*

Ptelea microcarpa, see *Ptelea trifoliata.*

Ptelea parvifolia, see *Helietta parvifolia.*

Ptelea rhombifolia, see *Ptelea trifoliata.*

Ptelea serrata, see *Ptelea trifoliata.*

Ptelea tomentosa, see *Ptelea trifoliata.*

Ptelea trifoliata L. **Hoptree.**
P. microcarpa Small, *P. tomentosa* Raf., *P. serrata* Small, *P. rhombifolia* Heller.
Range: 11, 16, 17, 20, 22, 23, 24, 25, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Samara; available in September, persistent until spring.

A large shrub to small or very rarely a large tree; flowers in June; 18,350 seeds per pound.

Ptilocalyx greggii Torr.
Coldenia greggii Gray.
Range: 11.
Site: Dry, sun.
Fruit: Nutlet.

A small, much-branched shrub.

Purshia glandulosa Curran. **Antelope brush.**
Kunzia glandulosa Greene, *P. tridentata glandulosa* Jones.
Range: 10.
Site: Dry, sun.
Fruit: Achene, available August–September.

A small to large evergreen shrub; flowers April–July.

Observations: Eagerly eaten by California mule deer.

Purshia tridentata (Pursh) DC. **Antelope brush.**
Kunzia tridentata Spreng.
Range: 4, 6, 7, 8, 9, 11, 12, 13, 14, 16.
Site: Dry, well-drained, sun.
Fruit: Achene, available in August.

A small to large shrub; flowers May–August.

Intricately branched, often many-stemmed; occurs in clay, sand, and other soils; root system fairly deep, scarcely spreading.

Stomach records: Columbian chipmunk, black-tailed deer. *Observations:* Of outstanding importance as browse for mule deer; pica, painted chipmunk, sage brush chipmunk; one of the chief browse plants for deer and antelope.

A very important browse plant seldom touched by horses but extensively cropped by goats, cattle, and especially sheep; palatability appears greatest in spring, winter, and late fall.

Pyracantha coccinea, see *Cotoneaster pyracantha.*

Pyrus americana, see *Sorbus americana.*

Pyrus angustifolia, see *Malus angustifolia.*

Pyrus arbutifolia, see *Aronia arbutifolia.*

Pyrus bracteata, see *Malus bracteata.*

Pyrus coronaria, see *Malus coronaria.*

Pyrus diversifolia, see *Malus fusca.*

Pyrus fusca, see *Malus fusca.*

Pyrus glabrata, see *Malus glabrata.*

Pyrus glaucescens, see *Malus glaucescens.*

Pyrus ioensis, see *Malus ioensis.*

Pyrus lancifolia, see *Malus lancifolia.*

Pyrus malus, see *Malus pumila.*

Pyrus melanocarpa, see *Aronia melanocarpa.*

Pyrus nigra, see *Aronia melanocarpa.*

Pyrus occidentalis, see *Sorbus occidentalis.*

Pyrus platycarpa, see *Malus platycarpa.*

Pyrus rivularis, see *Malus fusca.*

Pyrus sambucifolia, see *Sorbus americana.*

Pyrus sitchensis, see *Sorbus americana* and *S. sitchensis.*

Pyrus soulardii, see *Malus soulardii.*

Quercus spp. **Oaks.**

There are two classes of oaks; the black oak group and the white oak group. The acorns of the white oaks mature in a single season. Those of the black oaks ordinarily take 2 years to mature. It seems possible to insure a consistent crop of acorns by planting oaks of the two groups in mixtures when a consistent food supply is assured to wildlife. Where one type may fail to produce seed, the other may supplement. White and black oaks occur in about equal numbers in the eastern United States and in the Mexican Sierras, Cordillera, and tableland. The total number of species of white oaks in the United States amounts to about 54; of black oaks 26, and of an intermediate class 4, making a total of approximately 84 species. The timber produced by the white oaks is heavier, harder and more durable than that of the black oaks. Together they produce about half the hardwood lumber of the United States.

As a class the oaks are slow growing, long-lived, disease-resistant, very little subject to insect attacks. One thinks immediately of oak galls or oak apples, but these malformations are seldom of sufficient importance to make much difference to the general vigor and health of the species involved.

The poisonous properties of oaks should be considered in making any extensive plantings of them. It is known that concentrated feeding of stock on oak forage may result in tannic acid poisoning. This is true especially in the spring. However, cattle losses are apt to occur when other forage is scarce, as in the spring, in dry years, and on overgrazed range. Proper management of livestock should preclude any serious effects from the oaks. The best practices would include grazing cattle in summer and fall on oak, not grazing them before grass has had a chance to become lush, and in general, seeing to it that there is variety in forage. Chemical analyses show that the leaves are not a balanced ration for livestock and accordingly, they must be supplemented by grass or other feed. The deciduous species are more nutritive than the evergreen, and are more readily eaten by livestock.

While most tree oaks are recognized as having timber value, there are many shrubby species that may be profitably utilized for erosion-control planting and wildlife food and cover. These are the species ordinarily classed as scrub oaks. Certain of these are always shrubby, no matter in what site they may be growing. The tree oaks, however, may gradually become reduced in size in mountainous or arid regions. So far as known, there are no oaks which can be classed as weeds, although they are occasionally considered to be so in certain localities. Eradication, however, is not difficult.

Many of the species of scrub oaks are thicket forming and some reproduce by stolons. Their growth is generally vigorous, many are evergreen, and as a group are comparatively fast growing. The ability on the part of scrub oaks to form a dense cover rapidly is one which is well known. Altogether there would appear to be few plants that are more admirably adapted for erosion control, coupled with value to livestock, wild mammals, and birds, than the oaks.

Stomach records (in addition to specific records): Sixty-three species of birds including ruffed grouse (1 stomach with parts of 24 acorns and many with 10 to 20), bobwhite (36 parts of acorns in 1 stomach), Mearn's quail, California quail, Gambel quail, wild turkey, plumed quail, sharp-tailed grouse, ring-necked pheasant, greater prairie chicken, lesser prairie chicken (50 parts of acorns in 1 stomach), and mourning dove; ground squirrel, armadillo, opossum, black-tailed deer; Louisiana white-tailed deer, muskrat, raccoon, gray squirrel, eastern chipmunk, black bear, gray fox, white-tailed deer, ring-tailed cat, eastern skunk. Composed 4.5 percent of the entire fall food eaten by prairie chicken in Wisconsin; composed 5.0 percent of the winter food of ruffed grouse in the northeastern United States; composed 2.3 percent of food of 1,725 mallards. It may be noted here that stomach records show such birds as wrens and sparrows to have taken at least one complete acorn and that the comparatively large size of acorns apparently does not prevent even small birds from eating them.

Observations (in addition to specific records): Forty-nine species of birds including turkeys, ruffed grouse, sharp-tailed grouse, doves; acorns heavily utilized by lesser prairie chicken in the fall, and oak flowers an important food of the same bird in spring in Oklahoma, ranks sixth on the list of quail food plants of the Southeast; Merriam turkey; preferred fall food of prairie sharp-tailed grouse, ruffed grouse, and pinnated grouse; Mearn's quail; an important food of band-tailed pigeons; constituted a larger percentage of food of mule deer in the Kaibab National Forest than any other food; Columbian black-tailed deer; Texas white-tailed deer; red fox; raccoon, porcupine, Mexican raccoon, peccary, Virginia opossum, snowshoe hare, New Mexico black bear, Olympic black bear, Townsend's chipmunk, Siskiyou chipmunk, Allen's chipmunk, larger Colorado chipmunk, Arizona chipmunk, gray-footed chipmunk, cliff chipmunk, golden-mantled ground squirrel, chestnut-mantled ground squirrel, Douglas ground squirrel, southwestern chipmunk, little northern chipmunk, pale chipmunk, gray chipmunk; cut for food and building material in times of scarcity by beaver; Merriam's chipmunk; Douglas' squirrel, Sierra chickaree, digger squirrel, Abert's squirrel, Arizona gray squirrel, rock squirrel, gray squirrel, Carolina fox squirrel, Couch rock squirrel, black-backed rock squirrel, flying squirrels, California gray squirrel.

Without doubt there is a much greater number of animals, particularly squirrels and chipmunks, than here listed that feed on acorns. That they have not been recorded in the literature is evidence that acorns are so generally accepted as being food for squirrels and chipmunks that many workers have felt it unnecessary to record utilization.

Quercus acuminata, see *Quercus muhlenbergii.*

Quercus agrifolia Née. **California live oak.**

Range: 1, 5.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to large tree; evergreen; occurs in sand, loam, gravel, and other soils; attacked by tent caterpillars; wood of some value as fuel; a shrub in dry hills (Var. *frutescens* Engelm.).

Observations: California quail; California mule deer.

Quercus alba L. **White oak.**

Range: 20, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn; annual, available September–October.

A large tree, or rarely a low shrub with altitude; root system deep, taproot well developed; slow growing, very long-lived; not seriously injured by insects or fungi; not very fire resistant; difficult to transplant even as seedling; wood durable, of great importance commercially; bark a source of tannin; fruit borne when trees are 20 to 40 years old; full crops borne at intervals of 8 to 10 years, but some seed produced almost annually; 100–150 seeds per pound, germination 75–95 percent; coppice shorter lived and more tolerant of shade than seed-grown stock. Several varieties have been described, all of which occur within the range of the species.

Stomach records: Ruffed grouse. *Observations:* Ring-necked pheasant, bobwhite, ruffed grouse, wild turkey; an important food of white-tailed deer; cottontail rabbit; forms a considerable proportion of the food of the red squirrel.

Quercus alvordiana, see *Quercus dumosa.*

Quercus andromeda, see *Quercus virginiana.*

Quercus annulata, see *Quercus breviloba.*

Quercus aquatica, see *Quercus nigra.*

Quercus arizonica Sarg. **Arizona white oak.**

Range: 10, 11.
Site: Dry, well-drained, sun.
Fruit: Acorn; annual, available September–November.

A small to large shrub or small tree; fruit ripens very irregularly; a small shrub at higher elevations.

Observations: Thick-billed parrots; highly palatable to captive deer.

Quercus arkansana Sarg. **Arkansas oak.**

Range: 29.
Site: Well-drained, sun.
Fruit: Acorn; biennial.

A large tree; occurs in sandy and other soils; has been considered a hybrid between *Q. nigra* and *Q. marilandica.*

Quercus austrina, see *Quercus durandii.*

Quercus bicolor Willd. **Swamp white oak.**

Q. platanoides (La Marck) Sudw.
Range: 21, 22, 23, 24, 25, 26, 27, 28.
Site: Well-drained, moist, sun.
Fruit: Acorn; annual, available September–October.

A large tree; root system somewhat shallow; free from insects and diseases, fire-damaged especially when young; produces stump sprouts; wood durable, of commercial value; 90–125 seeds per pound, germination 80 percent.

Quercus borealis Michx. f. **Northern red oak.**

Q. rubra of auths., not L.
Range: 21, 22, 23, 24, 25, 26, 27.
Site: Well-drained, sun, shade.
Fruit: Acorn; biennial, available October–November.

A very large tree; rapid growing when young, long-lived; taproot deep; produces a denser shade than most oaks; severely injured by fire; much attacked by borers and subject to fungus attack, especially heart rot; apparently not drought resistant; coppices freely when young; wood of great importance commercially; 80–100 seeds per pound, germination 80–95 percent.

Var. *borealis maxima* (Marsh.) Ashe, (*Q. maxima* Ashe) is a large-fruited form occurring within the range of the species.

Stomach records: White-tailed deer. *Observations:* Ruffed grouse; tenth most important food of white-tailed deer in Massachusetts; forms a considerable portion of the food of red squirrels; cottontail rabbit; heavily browsed by moose on Isle Royal. *Observations:* Bobwhite; eaten by white-tailed deer in Missouri, and northern white-tailed deer in Michigan.

Quercus boyntonii Beadle. **Boynton oak.**
Q. stellata boyntonii (Beadle) Sarg.
Range: 27.
Site: Dry, sun.
Fruit: Acorn, annual.

A large, thicket-forming shrub.

Quercus brayi Small. **Bray's oak.**
Q. muhlenbergii brayi (Small) Sarg.
Range: 11, 16.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large tree. Acorns much sought after by livestock, including domesticated turkeys.

Quercus brevifolia, see *Quercus cinerea.*

Quercus breviloba, see also *Quercus durandii.*

Quercus breviloba (Torr.) Sarg.
Q. obtusifolia breviloba Torr., *Q. annulata* Buckl.
Range: 11, 16, 20.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

Commonly a large shrub, or a small to large tree; thicket forming; occurs on limestone and other soils.

Var. *laceyi* (Small) Trel., (*Q. laceyi* Small), the Lacey oak, is a particularly rapid-growing form.

A valuable browse for livestock.

Quercus breweri, see *Quercus garryana.*

Quercus californica, see *Quercus kelloggii.*

Quercus canbyi Trel.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A small to large tree.

Quercus catesbaei, see *Quercus laevis.*

Quercus chapmanii Sarg. **Chapman white oak.**
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Acorn, annual.

Commonly a small shrub or a large shrub to large tree; semievergreen; occurs in sandy and other soils.

Quercus chisosensis, see *Quercus gravesii.*

Quercus chrysolepis Liebm. **Canyon live oak.**
Range: 1, 4, 10, 11, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A small to large shrub, or small to large tree; evergreen; commonly shrubby on exposed sites; occurs in sand, loam, and other soils; forms a dense ground cover; long lived; stump sprouts abundantly produced, somewhat spiny; wood of some value commercially; the most ancient existing American oak; acorns much attacked by grubs.

Observations: California woodpecker; of slight importance as browse for mule deer.

Quercus cinerea Michx. **Bluejack oak.**
Q. brevifolia (Lam.) Sarg.
Range: 16, 20, 25, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial, available in November.

A small to large tree; occurs in sand, loam, and other soils; fruit produced in great profusion.

Quercus coccinea Muench. **Scarlet oak.**
Range: 21, 22, 23, 24, 25, 26, 27, 28.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial, available September–October.

A large tree; root system shallow; rapid growing, short-lived; much attacked by dry rot; coppices produced by young trees only; wood of importance commercially; much cultivated; apparently not drought resistant; 156–400 seeds per pound, germination 75 percent. Var. *tuberculata* Sarg. has larger acorns and occurs within the range of the species southward.

Observations: Bluejay, sharp-tailed grouse; white-tailed deer.

Quercus confusa Woot. and Standl.
Range: 11, 14.
Site: Well-drained, sun.
Fruit: Acorn, annual.

A small, somewhat evergreen tree.

Quercus densiflora, see *Lithocarpus densiflora.*

Quercus digitata, see *Quercus rubra.*

Quercus diversicolor Trel. **Netleaf oak.**
Q. reticulata of auths., not H. B. K.
Range: 10, 11, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A small to large shrub or small to large tree; evergreen.

Observations: Thick-billed parrot. Fair summer browse for stock.

Quercus douglasii Hook. and Arn. **California blue oak.**
Range: 1, 3, 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A small to large tree; slow growing; stump sprouts produced; subject to dry rot; wood much used locally for fuel; seed produced abundantly.

Observations: Of slight importance as browse for mule deer. Acorns much used for livestock feeding.

Quercus dumosa Nutt. **California scrub oak.**
Range: 1, 3, 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to small, or rarely large tree; evergreen; root system deep, taproot well developed, especially in seedling stages; commonly occurs in sterile soils; branches numerous, closely tangled, starting near from the ground; acorn crop ordinarily light and very uncertain; grows on all kinds of soils; killed by severe fires, but if not too severely burned, coppices and within 3 years again produces good cover; a small tree only on the California islands.

Var. *macdonaldii* (Greene) Jeps., (*Q. macdonaldii* Greene), the MacDonald oak, is in region 5, and has been claimed to be a hybrid between *Q. dumosa* and *Q. engelmannii.* Var. *bullata* Engelm. (*Q. durata* Jeps.), the leather oak, is a spreading, thicket-forming shrub occurring in regions 1 and 5. Var. *alvordiana* (Eastw.) Jeps. (*Q. alvordiana* Eastw.) occurs in region 5. Var. *turbinella* (Greene) Jeps. (*Q. turbinella* Greene), occurring in regions 5, 9, 11 and 14, is a small to large shrub considered a valuable winter browse plant for livestock. It has been observed to be eaten by Mearns, Gambel, and scaled quail.

Observations: Of outstanding importance as browse for mule deer. Important as a sheep and goat browse but distinctly inferior for cattle. The high tannin content of the plant necessitates careful handling of lambs where it occurs.

Quercus durandii Buckl. **Durand white oak.**
Q. breviloba (Torr.) Sarg., in part., *Q. sinuata* Walt., *Q. austrina* Small.
Range: 20, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to large tree; thicket forming and shrubby westward; occurs on limestone and other soils.

Quercus durata, see *Quercus dumosa.*

Quercus eastwoodiae Rydb.
Range: 11, 13.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub; not thicket forming.

Quercus ellipsoidalis Hill. **Jack oak.**
Range: 21, 22, 23, 24.
Site: Well-drained, sun.
Fruit: Acorn, biennial.

A small to large shrub or small to large tree; often occurs on clay soils.

Quercus emoryi Torr. **Emory oak.**
Q. hastata Liebm.
Range: 10, 11.
Site: Dry, well-drained, sun.
Fruit: Acorn; annual, available July–August, or ripening irregularly from June–September.

A small to large shrub or small to large tree; evergreen; wood somewhat used commercially.

Observations: Mearn's Gambel, and scaled quail; Mexican mule deer; Couch rock squirrel; much eaten by Gila chipmunk; highly palatable the year round to captive deer.

Quercus engelmannii Greene. **Evergreen white oak.**
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large evergreen tree; occurs on loam, sand, gravel, and other soils; wood useful only for fuel.

Observations: California mule deer.

Quercus falcata, see *Quercus rubra.*

Quercus fendleri Liebm. **Fendler oak.**
Q. undulata pedunculata DC.
Range: 11, 13, 14, 16.
Site: Dry, sun.
Fruit: Acorn, annual.

A large shrub; not thicket forming. Considered fair browse for cattle.

Quercus fusiformis, see *Quercus virginiana.*

Quercus gambelii, see also *Quercus leptophylla.*

Quercus gambelii Nutt. **Gambel oak.**
Q. douglasii gambelii DC., *Q. undulata gambelii* Engelm.
Range: 9, 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to small tree; resistant to heavy grazing.

Observations: Turkey. When associated with more palatable species, lightly grazed by cattle, sheep and horses; acorns sweet, relished by swine and other stock and with high fattening qualities; of moderately high palatability to goats; shoots contain 4–10 percent of tannic acid.

Quercus garryana Dougl. **Oregon white oak.**
Range: 1, 2.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to large tree; wood durable, valuable commercially.

Var. *breweri* (Engelm.) Jeps. (*Q. breweri* Engelm., *Q. oerstediana* Brown), the Brewer oak, is a small to large, spreading shrub occurring in region 4. It is much browsed by Rocky Mountain mule deer and much eaten by stock, the protein content of the foliage being almost equal to that of alfalfa hay. Var. *semota* Jeps., the Kaweah oak, is a shrub occurring in region 4.

Observations: Band-tailed pigeon, Lewis' woodpecker, ring-necked pheasant; bear.

Quercus geminata, see *Quercus virginiana.*

Quercus georgiana Curtis. **Georgia oak.**
Range: 27, 28.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A large, rare tree.

Quercus gravesii Sudw. **Grave's oak.**
Q. texana chisosensis Sarg., *Q. chisosensis* Sarg.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A small to large tree.

Quercus grisea Liebm. **Gray oak.**
Range: 11, 14, 16, 17.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub or rarely a small tree; partially evergreen; clump forming, bears great quantities of nut galls; wood useful only for fuel; very resistant to drought.

Observations: Viosca's pigeon, thick-billed parrot; Sonora deer, Arizona porcupine. An important local browse for livestock.

Quercus gunnisonii (Torr.) Rydb.
Q. alba gunnisonii Torr., *Q. gambelii gunnisonii* Wenz.
Range: 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A small to large shrub or small tree.

Quercus hastata, see *Quercus emoryi.*

Quercus havardii Rydb. **Shinnery oak.**
Range: 11, 16.
Site: Dry, sun.
Fruit: Acorn, annual.

A small shrub; thicket forming; grows in sandy soil; spreads by underground stems, the bulk of the species being underground; propagation is by separation of the root stocks as well as by acorns.

Observations: Bobwhite, prairie chicken; peccary. The large and sweet acorns are relished by livestock but this species has caused much poisoning.

Quercus humilis, see *Quercus pumila.*

Quercus hypoleuca Engelm. **Whiteleaf oak.**
Range: 11, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual, although often maturing the second season.

A large shrub to small or large tree; semievergreen; wood used locally.

Observations: Thick-billed parrot; favorite food of the Apache squirrel.

Quercus ilicifolia Wang. **Bear oak.**
Q. pumila (Marsh) Sudw., *Q. nana* Sarg.
Range: 22, 25, 26, 27, 28.
Site: Dry, well-drained, sun.
Fruit: Acorn biennial, available September–October.

A large shrub to small tree; thicket forming; often forms a nearly complete ground cover; fruit produced very prolifically; suckers freely; not evergreen, but dead leaves often persistent through the winter; often occurs in extremely sterile soils.

Stomach records: Ruffed grouse. *Observations:* Wild turkey; white-tailed deer.

Quercus imbricaria Michx. **Shingle oak.**
Range: 22, 23, 24, 25, 27, 28.
Site: Well-drained, moist, sun.
Fruit: Acorn; biennial, available September–October.

A large tree; wood used commercially; somewhat cultivated; 450–800 seeds per pound.

Observations: Red-headed woodpeckers.

Quercus intricata Trel.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A small, intricately branched shrub.

Quercus kelloggii Newb. **California black oak.**
Q. californica (Torr.) Cooper.
Range: 1, 3, 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A small shrub to large tree; occurs in sandy and other soils; root system deep; slow growing, long-lived; shrubbier at higher elevations; wood much used for fuel; stump sprouts freely produced, of rapid growth, often prostrate; subject to mistletoe.

Observations: Of outstanding importance as browse for mule deer.

Quercus laceyi, see *Quercus breviloba.*

Quercus laevis Walt. **Turkey oak.**
Q. catesbaei Michx.
Range: 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A large tree; commonly occurs in sandy soil; root system deep; rather rapid growing, generally short-lived; free from insects and disease.

Quercus laurifolia Michx. **Laurel oak.**
Range: 20, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Acorn; biennial, available September–October.

A large tree; occurs in sand, loam, and other soils; somewhat cultivated; 540–690 seeds per pound.

Var. *rhombica* (Sarg.) Trel., (*Q. rhombica* Sarg., *Q. obtusa Ashe*) occurs within the range of the species.

Quercus leiodermis, see *Quercus velutina.*

Quercus leptophylla Rydb. **Rocky Mountain white oak.**
Q. gambelii Nutt., in part.
Range: 13, 14.
Site: Well-drained, sun.
Fruit: Acorn, annual.

A large tree; commonly occurs in groups; wood hard, strong, used for fuel.

Quercus lobata Née. **Valley white oak.**
Range: 3, 4, 5.
Site: Well-drained, sun, shade.
Fruit: Acorn, annual.

A large tree; ordinarily occurs in richer soils; rapid growing; wood of some value commercially; taproot well developed; long-lived; produces very abundant crops of acorns; weeping trees confined to fertile loam soils.

Observations: Of slight importance as browse for mule deer.

Quercus lyrata Walt. **Overcup oak.**
Range: 20, 22, 25, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Acorn; annual, available September–October.

A small to large tree; commonly does not occur on poor soils; root system deep, taproots and deep-seated laterals well-developed; slow growing, long-lived; generally free from insects and disease; resistant to fire; wood durable, of importance commercially; 150 seeds per pound, commonly produced abundantly every 3 or 4 years. Young plants browsed by cattle.

Quercus macdonaldii, see *Quercus dumosa.*

Quercus macrocarpa Michx. **Bur oak.**
Range: 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn; annual, available September–October.

Rarely a large shrub to small tree, or more commonly a large tree; root system deep, especially on dry sites; commonly occurs on rich, not poor soils, although often found in sand; slow growing, long-lived; not seriously injured by fungi or insects, except rarely June beetles; more resistant to smoke than most oaks; wood durable, much used commercially; 380–400 seeds per pound, germination 60–75 percent, vitality 6 to 12 months.

Observations: Wood duck; acorns form a considerable portion of food of red squirrel; white-tailed deer. Young plants browsed by stock.

Quercus margaretta Ashe. **Small post oak.**
Q. stellata margaretta Sarg.
Range: 20, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to small tree; occurs on sandy and other soils. Var. *stolonifera* Ashe forms dense thickets by means of stolons.

Quercus marilandica Muench. **Blackjack oak.**
Range: 16, 19, 20, 22, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn; biennial, available in October.

In the north, a large shrub; in the south, a large tree; commonly occurs on sand, clay, loam, and other soils; wood rarely used commercially. Var. *ashei* Sudw. occurs in regions 19, 20, and 29.

Stomach records: Wild turkey; white-tailed deer. *Observations:* A greatly preferred food of wild turkey, white-tailed deer.

Quercus maxima, see *Quercus borealis.*

Quercus media Woot. and Standl.
Range: 11, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to small tree; thicket forming.

Quercus michauxii, see *Quercus prinus.*

Quercus microcarya, see *Quercus nigra.*

Quercus minima, see *Quercus virginiana.*

Quercus minor, see *Quercus stellata.*

Quercus mohriana Buckl. **Shin oak.**
Range: 11, 16, 17, 19, 20.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

Usually a small shrub, more rarely a small tree; thicket forming; occurs on limestone, sandy, and other soils; becomes a tree only in deep ravines and on steep hillsides where protected.

Quercus montana Willd. **Chestnut oak.**
Q. prinus of auths., not L.
Range: 22, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Acorn; annual, available October–November.

A large tree; root system deep; occurs on rich or poor soils; fairly rapid growing, long-lived; seedlings tolerant of shade; very fire resistant; coppices freely when young; wood durable, much used commercially; bark contains more tannin than any other eastern oak; 60–150 seeds per pound.

Quercus muhlenbergii Engelm. **Chinquapin oak.**
Q. acuminata Sarg.
Range: 11, 16, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn; annual, available October–November.

Commonly a small, or more rarely, a large tree; may occur on limestone soil; taproot well developed; rather rapid growing; becomes more intolerant of shade with age; free from insects and disease; young growth easily damaged by fire; stump sprouts produced; wood durable, used commercially; 520 seeds per pound.

Quercus myrtifolia Willd. **Myrtle oak.**
Range: 17, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A small to large shrub or small tree; thicket forming; commonly occurs on sandy soil.

Quercus nana, see *Quercus ilicifolia.*

Quercus nigra L. **Water oak.**
Q. aquatica Walt.
Range: 17, 20, 25, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Acorn; biennial, available October–November.

A large tree; rapid growing in good soils; occurs in sand, loam and other soils; wood somewhat used commercially; much cultivated; very susceptible to mistletoe; 400–600 seeds per pound. A form described as *Q. microcarya* Small occurs on Stone Mountain, Ga.

Quercus nitescens, see *Quercus novomexicana.*

Quercus novomexicana (DC.) Rydb. **New Mexican shinnery.**
Q. douglasii novomexicana DC., *Q. nitescens* Rydb.
Range: 11, 13, 14, 16.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to small or large tree.

Quercus oblongifolia Torr. **Mexican blue oak.**
Range: 10, 11, 17.
Site: dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to small or large trees; evergreen; often thicket forming, especially at the heads of canyons; produces fruit even as a shrub.

Observations: Highly palatable to captive deer.

Quercus obtusa, see *Quercus laurifolia.*

Quercus obtusifolia (DC.) Rydb.
Q. undulata obtusifolia DC.
Range: 14, 29.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to small tree.

Quercus oerstediana, see *Quercus garryana.*

Quercus pagoda, see *Quercus rubra.*

Quercus pagodaefolia, see *Quercus rubra.*

Quercus palmeri Engelm. **Palmer oak.**
Q. chrysolepis palmeri Engelm.
Range: 5, 10, 11.
Site: Dry, sun.
Fruit: Acorn, biennial.

A large, divaricately-branched, evergreen shrub.

Quercus palustris Muench. **Pin oak.**
Range: 21, 22, 23, 24, 25, 27, 29.
Site: Well-drained, sun.
Fruit: Acorn; biennial, available September–October.

A large tree; root system well developed laterally; rather rapid growing and short-lived; resistant to dust and smoke; free from insects and disease; coppices fairly well; much cultivated; wood used commercially; 600 seeds per pound.

Observations: Bobwhite, mourning dove; cottontail rabbit.

Quercus pauciloba Rydb. **MacDougal oak.**
Range: 13, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub, or more commonly a small to large tree.

Quercus phellos L. **Willow oak.**
Range: 20, 25, 27, 28, 29, 30.
Site: Well-drained, sun.
Fruit: Acorn; biennial, available in October.

A large tree; occurs in sandy and other soils; wood used commercially; much cultivated; 600 seeds per pound.

Stomach records: Gray fox. *Observations:* Wild turkey, mourning dove, bobwhite.

Quercus platanoides, see *Quercus bicolor.*

Quercus pricei Sudw. **Coast live oak.**

Range: 5.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A small to large evergreen tree; occurs in gravelly and other soils. Hardly separable from *Q. agrifolia.*

Quercus prinoides Willd. **Dwarf chinquapin oak.**

Range: 21, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, sun.
Fruit: Acorn; annual, available September–October.

A large shrub to small tree; thicket forming; occurs on sandy, limestone and other soils; 400 seeds per pound.

Observations: Ruffed grouse, cottontail rabbit.

Quercus prinus, see also *Quercus montana.*

Quercus prinus L. **Swamp chestnut oak.**

Q. michauxii Nutt.

Range: 20, 25, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Acorn; annual, available September–October.

A large tree; taproot and deep laterals well developed; long-lived; generally free from insects and diseases; easily fire-damaged when young; stump sprouts never large; wood durable, much used commercially; a fertile-soil species; 70–150 seeds per pound, germination 86 percent.

Stomach records: Mourning dove; white-tailed deer. *Observations:* Cottontail rabbit.

Quercus pumila, see also *Quercus ilicifolia.*

Quercus pumila Walt. **Running oak.**

Q. humilis Walt.

Range: 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Acorn, annual.

A small evergreen shrub; often forms small sparse thickets by means of root stocks; not a pioneer species.

Stomach records: Bobwhite.

Quercus pungens, see *Quercus undulata.*

Quercus reticulata, see *Quercus diversicolor.*

Quercus rhombica, see *Quercus laurifolia.*

Quercus rubra, see also *Quercus borealis.*

Quercus rubra L. **Southern red oak.**

Q. falcata (Michx.) of Amer. auths., *Q. digitata* (Marsh.) Sudw.

Range: 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn; biennial, available September–October.

A large tree; root system deep as well as shallow on the same tree; occurs on sandy or heavy soils; rapid growing, rather short-lived; very sensitive to late frosts; much attacked by heart rot; coppices freely, especially when young; much cultivated; wood not durable, somewhat used commercially.

Var. *pogodaefolia* (Ell.) Ashe, (*Q. pogodaefolia* (Ell.) Ashe, *Q. pagoda* Raf.), and var. *leucophylla* Ashe, both occur within the range of the species.

Quercus rydbergiana Cockerell. **Rydberg oak.**

Q. undulata rydbergiana Cockerell.

Range: 13, 14.
Site: Dry, sun.
Fruit: Acorn, annual.

A small evergreen shrub.

Quercus sadleriana Brown. **Sadler oak.**

Range: 4.
Site: Dry, well-drained, sun, shade.
Fruit: Acorn, annual.

A small to large evergreen shrub; forms dense thickets; occurs at altitudes of from 5,000–7,000 feet.

Observations: Acorns relished by deer and bear. Poor to fair browse for livestock, but acorns relished.

Quercus schneckii, see *Quercus shumardii.*

Quercus shumardii Buckl. **Shumard red oak.**
Q. texana Sarg.
Range: 16, 20, 22, 24, 25, 27, 28, 29.
Site: Dry, well-drained, moist.
Fruit: Acorn; biennial, available in October.

A very large tree; occurs on limestone and other soils; root system shallow; free from insects and diseases; wood of value commercially.

Var. *schneckii* (Britt.) Sarg., (*Q. schneckii* Britt.), the Schneck red oak, occurs also in region 17.

Quercus sinuata, see *Quercus durandii.*

Quercus stellata Wang. **Post oak.**
Q. minor (Marsh.) Sarg.
Range: 19, 20, 22, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn; annual, available September–October.

A large tree; commonly occurs in poor soil such as sand and gravel; root system deep; slow growing; long-lived; tolerant of shade only when young; fruit produced abundantly every 2 or 3 years; wood durable, difficult to season, much used commercially; 35–636 seeds per pound.

Stomach records: Wild turkey. *Observations:* A preferred food of wild turkey; white-tailed deer.

Quercus submolis Rydb.
Q. utahensis submollis (Rydb.) Sarg.
Range: 9, 10, 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to small tree.

Quercus subturbinella Trel.
Range: 11, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to small tree.

Quercus texana Buckl. **Texas red oak.**
Range: 11, 16, 17, 20, 29.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A small to large tree; occurs on limestone and other soils. Var. *stellapila* Sarg., occurs within the range of the species; by some it is considered specifically distinct.

Quercus texana, see *Quercus shumardii.*

Quercus tomentella Engelm. **Island live oak.**
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A large evergreen tree; moderately long-lived; occurs in gravelly and other soils. Possibly only a variety of *Q. chrypolepis.*

Quercus toumeyi Sarg. **Toumey oak.**
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large shrub to large tree; more or less evergreen.

Quercus turbinella, see *Quercus dumosa.*

Quercus undulata Torr. **Rocky Mountain shin oak.**
Q. vaseyana Rydb., *Q. vaseyana* Buckl., *Q. undulata vaseyana* Rydb.
Range: 9, 11, 13, 14, 16, 17, 20.
Site: Dry, sun.
Fruit: Acorn, annual.

A small to large shrub or small to large tree; somewhat evergreen; forms thickets of vast extent; bears great quantities of nut galls.

Var. *pungens* Engelm. (*Q. pungens* Liebm.), the holly oak, occurs in regions 9 and 11.

Stomach records: Prairie chicken. Fair to fairly good cattle feed in winter and spring; good goat feed, especially in spring.

Quercus utahensis (DC.) Rydb. **Rocky Mountain white oak.**
Q. stellata utahensis DC.
Range: 9, 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A large tree; root system shallow with occasional deep-feeding branches, or sometimes altogether deep; wood used to some extent for fuel.

Stomach records: Porcupine, black-tailed deer.

Quercus vaccinifolia Kellogg. **Huckleberry oak.**
Q. chrysolepis vaccinifolia (Kellogg) Engelm.
Range: 4.
Site: Dry, sun.
Fruit: Acorn, biennial.

A small, thicket-forming evergreen shrub.

Stomach records: Sooty grouse. *Observations:* Of outstanding importance as browse for mule deer. Acorns readily eaten by livestock, but foliage of low palatability.

Quercus vaseyana, see *Quercus undulata.*

Quercus velutina Lam. **Black oak.**
Range: 20, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Acorn; biennial, available October–November.

A large tree; commonly occurs on poor soil; taproot at first well developed, later superficial; seedlings slow growing; long-lived; coppice freely produced, rapid growing, short-lived; wind-firm; rarely injured by insects, except when fire-damaged; susceptible to drought injury; easily fire-damaged; wood used commercially; usually attacked by heart rot; 130–300 seeds per pound, germination 80 percent or more.

Var. *missouriensis* Sarg., (*Q. leiodermis* Ashe), the smooth-bark oak, occurs with the species westward.

Observations: Cottontail rabbit, white-tailed deer.

Quercus venustula Greene.
Range: 13, 14.
Site: Dry, sun.
Fruit: Acorn, annual.

A small to large shrub; acorns commonly produced abundantly.

Quercus virginiana Mill. **Live oak.**
Range: 11, 16, 17, 20, 25, 29, 30, 31.
Site: Dry, well-drained, sun.
Fruit: Acorn; annual, available September–October.

A small to large shrub or small to large, evergreen tree; occurs on sand, clay, and alluvial soils; root system deep, spreading; fruit often produced by plants 12 inches in height; able to grow very close to the sea, where roots may be covered with salt water at high tide; rapid growing at first, later slower; long-lived; free from insects and diseases; produces stump sprouts; branches very wide-spreading; wood durable, of little importance commercially.

Var. *geminata* (Small) Sarg., (*Q. geminata* Small) occurs in regions 29 and 30. Var. *virescens* Sarg. occurs in Florida. Var. *macrophylla* Sarg., with larger leaves, occurs in southeastern Texas. Var. *eximea* Sarg., (*Q. andromeda* Ridd.) of eastern Louisiana, has smaller leaves and acorns. Var. *fusiformis* (Small) Sarg., (*Q. fusiformis* Small) occurs in regions 16 and 20 and is generally shrubby. Var. *minima* (Small) Sarg., (*Q. minima* Small, *Q. virginiana dentata* Chapm.) occurs in region 30, is usually less than 3 feet high, and has underground stems. Var. *maritima* (Michx.) Small occurs in regions 29 and 30 and is shrubby. Var. *pygmaea* Sarg. has smaller acorns, is a shrub, and occurs in region 30.

Quercus vreelandii Rydb.
Range: 11, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Acorn, annual.

A small to large shrub.

Quercus wilcoxii Rydb. **Wilcox oak.**
Range: 9, 11, 14.
Site: Dry, sun.
Fruit: Acorn, biennial.

A small to large shrub or rarely a small tree; evergreen; thicket forming. Not eaten to any extent by cattle.

Quercus wislizenii DC. **Highland live oak.**
Range: 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Acorn, biennial.

A large shrub to small or large tree; evergreen; not as tolerant of shade as formerly supposed; coppices quickly after fires, but such growth is slow; attacked by mistletoe; makes good soil cover; acorns not produced in very great quantities; wood not durable, locally valuable as fuel; occurs in loam, gravel, and other soils; near the coast and on the California islands generally shrubby.

Observations: Of fair importance as browse for mule deer.

Ramona incana, see *Salvia carnosa.*

Ramona polystachya, see *Salvia apiana.*

Ramona stachyoides, see *Salvia mellifera.*

Raphis acaulis, see *Sabal minor.*

Rhamnus spp. **Buckthorns.**

Most species occur on neutral soil; some species are secondary hosts for the crown rust of oats; propagation is by seeds stratified and sown in spring or by soft or hardwood cuttings made at the nodes.

Observations (in addition to specific records): Three species of birds; generally relished by birds. Evergreen species have a limited value as browse for livestock in winter.

Rhamnus alnifolia L'Her. **Alder-leaved buckthorn.**
Range: 4, 12, 18, 21, 22, 23, 24, 26, 27.
Site: Well-drained, moist, shade.
Fruit: Drupe, available July–September.

A small shrub; flowers May–June; branches decumbent, rooting; thicket forming. Of no value as browse for cattle; poor to fair browse for sheep.

Rhamnus betulaefolia Greene. **Birchleaf buckthorn.**
R. californica betulaefolia (Greene) Trel., *R. confinis* Greene, *R. ellipsoidea* Greene, *R. revoluta* Rose.
Range: 9, 11, 14.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available, September–October.

A small to large shrub; flowers May–June; not a secondary host for oat crown rust.

Rhamnus californica Esch. **California buckthorn.**
Range: 1, 3, 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Drupe, available August–September.

A large evergreen shrub; flowers March–April; a secondary host for the rust of velvet grass but not oats.

Var. *tomentella* (Benth.) Brewer and Wats. (*R. tomentella* Benth., *R. ursina* Greene) (pl. 27, *B*), commonly more compact, bushy, and robust than the species, occurs in regions 3, 4, 5, 10, and 11. Var. *viridis* Jeps. (*R. cuspidata* Greene) occurs in regions 4, 5, 9, and 10. Var. *obtusissima* (Greene) Jeps., (*R. obtusissima* Greene) occurs in region 4. Var. *occidentalis* (Howell) Jeps. (*R. occidentalis* Howell), occurs in region 1.

Stomach records: Seven species of birds. *Observations:* Four species of birds, including band-tailed pigeon; California mule deer, black bear. Of some importance as a honey plant. Of no value as forage for cattle; poor to fair for sheep.

Rhamnus caroliniana Walt. **Yellow buckthorn.**
Range: 17, 20, 22, 25, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available September–November.

A large shrub to small or large tree; flowers May–June; occurs on limestone, loam, and other soils; susceptible to the crown rust of oats.

Stomach records: Catbird.

Rhamnus catalinae, see *Rhamnus crocea.*

Rhamnus confinis, see *Rhamnus betulaefolia.*

Rhamnus crocea Nutt. (pl. 29, *A*, *B*). **Hollyleaf buckthorn.**
Range: 3, 5, 11.
Site: Dry, well-drained, sun.
Fruit: Drupe, available August–September.

A small to large shrub, or rarely a small to large tree; partially evergreen; flowers February–May; densely branched; experimentally susceptible to the crown rust of oats.

Var. insularis Sarg. (*R. insularis* Greene, *R. pirifolia* Greene, *R. catalinae*, Davids.) has larger berries, and occurs in region 5. Var. *ilicifolia* (Kellogg) Greene (*R. ilicifolia* Kellogg) has spiny leaves, is more commonly treelike, and occurs in regions 4, 5, and 10. Var. *pilosa* Trel. (*R. pilosa* Abrams) occurs in region 5.

Stomach records: Mountain sheep. *Observations:* California mule deer.

Rhamnus cuspidata, see *Rhamnus californica.*

Rhamnus ellipsoidea, see *Rhamnus betulaefolia.*

Rhamnus fasciculata, see *Rhamnus smithii.*

Rhamnus humboldtiana, see *Karwinskia humboldtiana.*

Rhamnus ilicifolia, see *Rhamnus crocea.*

Rhamnus insularis, see *Rhamnus crocea.*

Rhamnus lanceolata Pursh. **Lance-leaved buckthorn.**
Range: 22, 25, 27, 29.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available August–September.

A small to large shrub; flowers in May; commonly occurs on calcareous soils; susceptible to crown rust of oats.

Stomach records: Three species of birds.

Rhamnus maculata, see *Karwinskia humboldtiana.*

Rhamnus obtusifolia, see *Condalia obtusifolia.*

Rhamnus obtusissima, see *Rhamnus californica.*

Rhamnus occidentalis, see *Rhamnus californica.*

Rhamnus pilosa, see *Rhamnus crocea.*

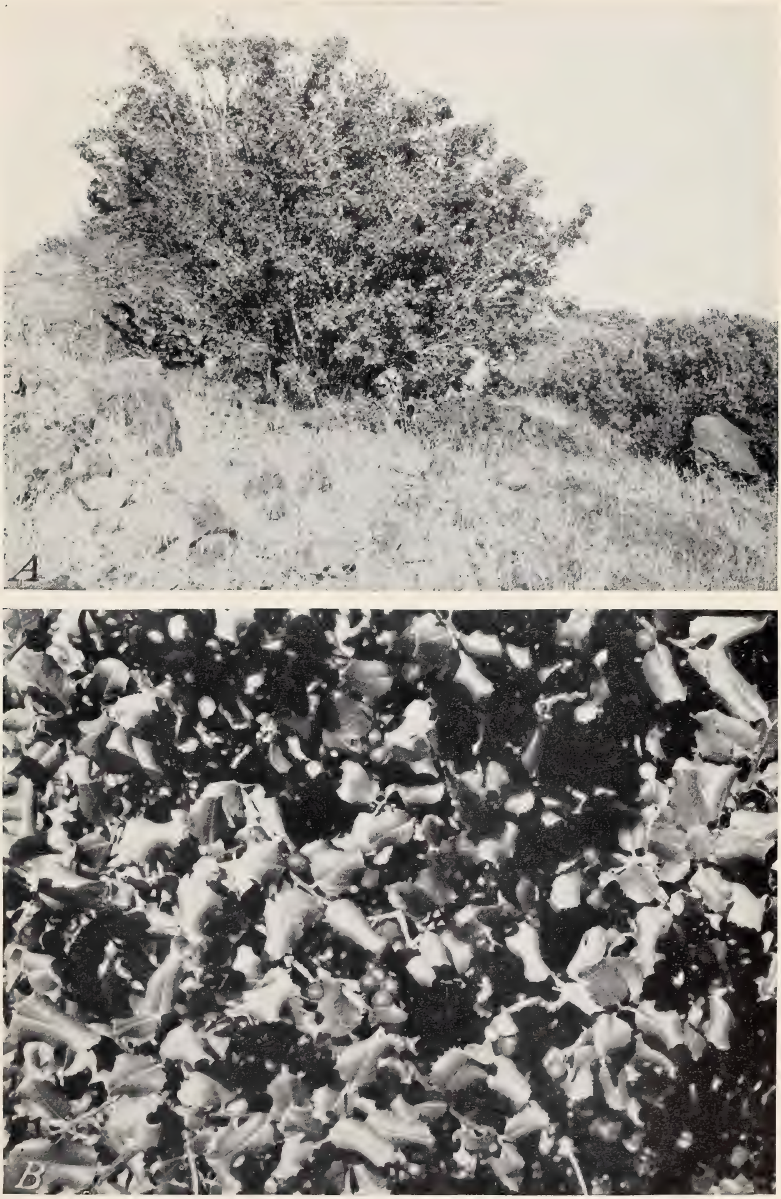
Rhamnus pirifolia, see *Rhamnus crocea.*

Rhamnus purshiana DC. (pl. 30, *A*, *B*). **Cascara.**
Range: 1, 2, 3, 4, 6, 7, 9, 11, 12.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe, available July–September.

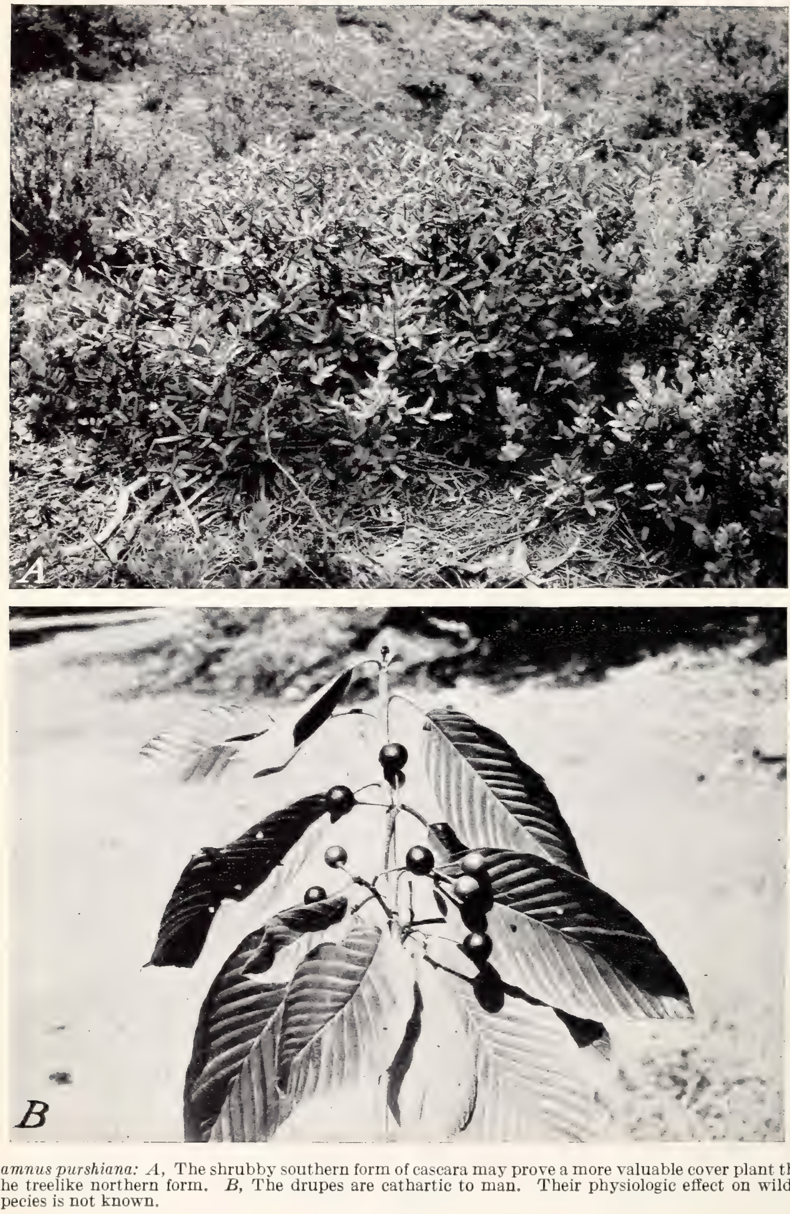
A small to large shrub or a small to large tree; occurs on sand, gravel, loam, and other soils; experimentally susceptible to the crown rust of oats; coppices freely after cutting; bark of importance commercially; commonly smaller southward; 4,735 seeds per pound.

Stomach records: Seven species of birds. *Observations:* Five species of birds, including Oregon ruffed grouse, band-tailed pigeon; New Mexico black bear; of fair importance as browse for mule deer; Olympic black bear, Oregon gray fox, raccoon, ring-tailed cat. Without forage value for livestock.

Rhamnus revoluta, see *Rhamnus betulaefolia.*



Rhamnus crocea: A, A large specimen of hollyleaf buckthorn forming an effective cover on poor soil; *B,* a close view of the dense foliage and fruit.



Rhamnus purshiana: A, The shrubby southern form of cascara may prove a more valuable cover plant than the treelike northern form. *B,* The drupes are cathartic to man. Their physiologic effect on wildlife species is not known.

Rhamnus rubra Greene. **Redstem buckthorn.**
Range: 4.
Site: Well-drained, sun.
Fruit: Drupe, available August–September.

A small shrub; flowers in June; susceptibility to crown rust of oats not known.

Rhamnus smithii Greene. **Smith buckthorn.**
R. fasciculata Greene.
Range: 11, 13, 14.
Site: Well-drained, moist, sun.
Fruit: Drupe.

A small to large, dioecious, densely leafy shrub; susceptible to the crown rust of oats.

Rhamnus texensis, see *Colubrina texensis.*

Rhamnus tomentella, see *Rhamnus californica.*

Rhamnus ursina, see *Rhamnus californica.*

Rhapidophyllum hystrix (Fraser) Wendl. and Drude. **Needle palm.**
Chamaerops hystrix Fraser, *Corypha hystrix* (Fraser) Desf., *Sabal hystrix* Desf.
Range: 29, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe.

A small to large evergreen shrub; rootstocks creeping and rooting.

Rhododendron spp.

This genus has often been divided into several separate genera or genus sections. The most notable for the United States are rhododendron and azalea. It is generally agreed among botanists that these two cannot be maintained as separate genera although they may well appear to be separable as far as the species in this country are concerned. They are here treated as one. The species popularly known as azaleas are largely deciduous, at least in North America. Those known as rhododendrons are mostly evergreen. The azaleas are generally to be found growing in the sun; the rhododendrons make their best growth in the shade. Nevertheless, there are no constant botanical characters to separate them.

Rhododendron alabamense Rehd. **Alabama azalea.**
Azalea alabamense (Rehd.) Small.
Range: 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small shrub; flowers April–May.

Rhododendron albiflorum Hook. **White-flowered azalea.**
Azaleastrum albiflorum (Hook.) Rydb., *Azalea albiflora* Kuntze., *Cladothamnus campanulatus* Greene.
Range: 4, 12.
Site: Well-drained, shade.
Fruit: Capsule.

A small to large shrub; flowers June–July. While under normal range conditions it is not palatable to livestock, it is nevertheless poisonous.

Rhododendron arborescens (Pursh) Torr. **Smooth azalea.**
Azalea arborescens Pursh.
Range: 27.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.

A small to large shrub or rarely a small tree; flowers June–July.

Rhododendron atlanticum (Ashe) Rehd.
Azalea atlantica Ashe.
Range: 28, 29, 30.
Site: Dry, well-drained, sun, half shade.
Fruit: Capsule.

A small shrub; flowers April–May; mat forming; aggressive; spreads by means of stolons; many often invade fields.

Rhododendron austrinum (Small) Rehd.
Azalea austrina Small.
Range: 30.
Site: Well-drained, moist, shade.
Fruit: Capsule.

A large shrub; flowers April–May; commonly occurs on sandy soil.

Rhododendron calendulaceum (Michx.) Torr. **Flame azalea.**
Azalea calendulacea Michx., *A. lutea* L.
Range: 27, 28.
Site: Well-drained, sun, shade.
Fruit: Capsule.

A small to large shrub; flowers May–June; branches erect or spreading; very ornamental.

Rhododendron californicum Hook. **California rose-bay.**
R. macrophyllum Don.
Range: 1, 2.
Site: Well-drained, sun.
Fruit: Capsule.

A small to large shrub or rarely a small tree; evergreen; flowers May–June; considered poisonous to sheep.

Rhododendron canadense (L.) B. S. P. **Rhodora.**
R. canadense Torr., *R. rhodora* Gmel., *Rhodora canadensis* L.
Range: 26, 27.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small, much-branched shrub; flowers in May.

Rhododendron canescens (Michx.) Sweet. **Hoary azalea.**
Azalea canescens Michx, not Small.
Range: 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.

A large sparingly-branched shrub, flowers April–May; occurs in sandy and other soils.

Rhododendron carolinianum Rehd. **Carolina rhododendron.**
Range: 27.
Site: Well-drained, sun.
Fruit: Capsule.

A large, much-branched evergreen shrub; flowers April–May.

Rhododendron catawbiense Michx. (pl. 31). **Catawba rhododendron.**
Range: 27, 28.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.

A large evergreen shrub; flowers May–June; often forms thickets covering extensive tracts of land; poisonous to livestock either fresh or dry.

Rhododendron cuthbertii, see *Rhododendron minus.*

Rhododendron lapponicum (L.) Wahl. **Lapland rose-bay.**
Azalea lapponica L.
Range: 26.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A small, prostrate evergreen shrub, commonly occurring on alpine summits.

Rhododendron macrophyllum, see *Rhododendron californicum.*

Rhododendron maximum L. **Rhododendron.**
Range: 24, 26, 27.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.

A large shrub to small tree; evergreen; flowers June–July; thicket forming; much cultivated.

Stomach records: Sharp-tailed grouse; white-tailed deer. *Observations:* Eaten by deer but poisonous to them if taken in large quantities. Poisonous to stock, which avoid it unless very hungry.

Rhododendron minus Michx. **Piedmont rhododendron.**
R. cuthbertii Small., *R. punctatum* Ander.
Range: 28, 29.
Site: Well-drained, sun, shade.
Fruit: Capsule.
A small to large, straggling evergreen shrub; commonly occurs on sandy soil.

Rhododendron nudiflorum (L.) Torr. **Pinxter flower.**
Azalea nudiflora L.
Range: 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Capsule.
A small to large shrub; flowers April–May; commonly occurs in sandy soil.

Rhododendron oblongifolium (Small) Mill.
Azalea oblongifolia Small.
Range: 25, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Capsule.
A small to large shrub; commonly occurs in sand or limestone soils.

Rhododendron occidentale (Torr. and Gray) Gray. **Western azalea.**
Azalea occidentalis Torr. and Gray, *A. californica* Torr. and Gray.
Range: 4.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.
A large shrub; flowers June–July; rarely occurs in sunny positions.
Observations: Much used by mountain beaver. An important livestock-poisoning plant.

Rhododendron prinophyllum, see *Rhododendron roseum.*

Rhododendron prunifolium (Small) Mill.
Azalea prunifolia Small.
Range: 29.
Site: Well-drained, moist, shade.
Fruit: Capsule.
A large shrub.

Rhododendron punctatum, see *Rhododendron minus.*

Rhododendron rhodora, see *Rhododendron canadense.*

Rhododendron roseum (Loisel.) Rehd.
R. prinophyllum (Small) Mill., *Azalea rosea* Loisel., *A. prinophylla* Small, *A. canescens* Porter, not Torr., and of Small, not Michx.
Range: 25, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A large shrub; often dominant and thicket forming in old clearings; very ornamental.

Rhododendron serrulatum (Small) Mill.
Azalea serrulata Small.
Range: 30.
Site: Moist, well-drained, sun.
Fruit: Capsule.
A large shrub.

Rhododendron speciosum (Willd.) Sweet.
Azalea speciosa Willd.
Range: 27, 28, 29.
Site: Well-drained, sun.
Fruit: Capsule.
A small to large shrub; flowers April–May; thicket forming; commonly occurs on sandy soil.

Rhododendron vaseyi Gray. **Pinkshell azalea.**
Azalea vaseyi (Gray) Rehd., *Biltia vaseyi* (Gray) Small.
Range: 27.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.
A small to large shrub; occurs in sandy and other soils; in cultivation.

Rhododendron viscosum (L.) Torr. **Swamp azalea.**
Azalea viscosa L.
Range: 25, 26, 27, 28, 29, 30.
Site: Moist, sun, shade.
Fruit: Capsule.

A large shrub; flowers June–July; stoloniferous forms are often found.

Rhodora canadensis, see *Rhododendron canadense.*

Rhoeidium cinereum, see *Rhus microphylla.*

Rhoeidium microphyllum, see *Rhus microphylla.*

Rhoeidium potosinum, see *Rhus microphylla.*

Rhus spp.

This genus has been variously divided. One section in particular, (*Lobadium* (Raf.) DC.), has been much separated as *Schmaltzia.* The group *Venenatae* Engelm. has been much separated as *Toxicodendron.*

Most species grow on neutral soil; nearly all species are comparatively free from insects and diseases; propagation is by stem or root cuttings, or by seed sown as soon as ripe or stratified and sown in spring.

Stomach records (in addition to specific records): Seventy-one species of birds including ruffed grouse, sharp-tailed grouse, lesser prairie chickens, bobwhite, California quail, plumed quail, wild turkey, and mourning dove; composed 3.17 percent of winter food of ruffed grouse in New York, and 3.8 percent of winter food of the same bird for the northeastern United States; opossum. *Observations* (in addition to specific records): Thirty-three species of birds, including ruffed grouse. An important food of bobwhite in Oklahoma; ranks tenth in the list of quail food plants in the Southeast; Mearn's quail; rock squirrel, cedar-belt cottontail; preferred food of cottontail rabbit.

Rhus albida, see *Rhus glabra.*

Rhus angustiarum, see *Rhus glabra.*

Rhus arbuscula, see *Rhus glabra.*

Rhus arguta, see *Rhus glabra.*

Rhus aromatica Ait. (pls. 32 *A, B:* 33). **Fragrant sumac.**
R. canadensis Marsh., *R. crenata* (Mill.) Rybd., *R. nortonii* (Greene) Rydb., *Schmaltzia aromatica* Desv., *S. arenaria* Greene, *S. illinoensis* Greene.
Range: 20, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe; available July–August, persistent the year round.

A small to large shrub; adapted to many kinds of soil including limestone; thicket forming.

Stomach records: Western flicker, ruffed grouse. *Observations:* Preferred food of wild turkey; white-tailed deer.

Rhus ashei (Small) Greene.
R. caroliniana Ashe, not Mill., *Schmaltzia ashei* Small.
Range: 28.
Site: Well-drained, sun.
Fruit: Drupe.

A small shrub; commonly occurs in sandy soil.

Rhus asplenifolia, see *Rhus glabra.*

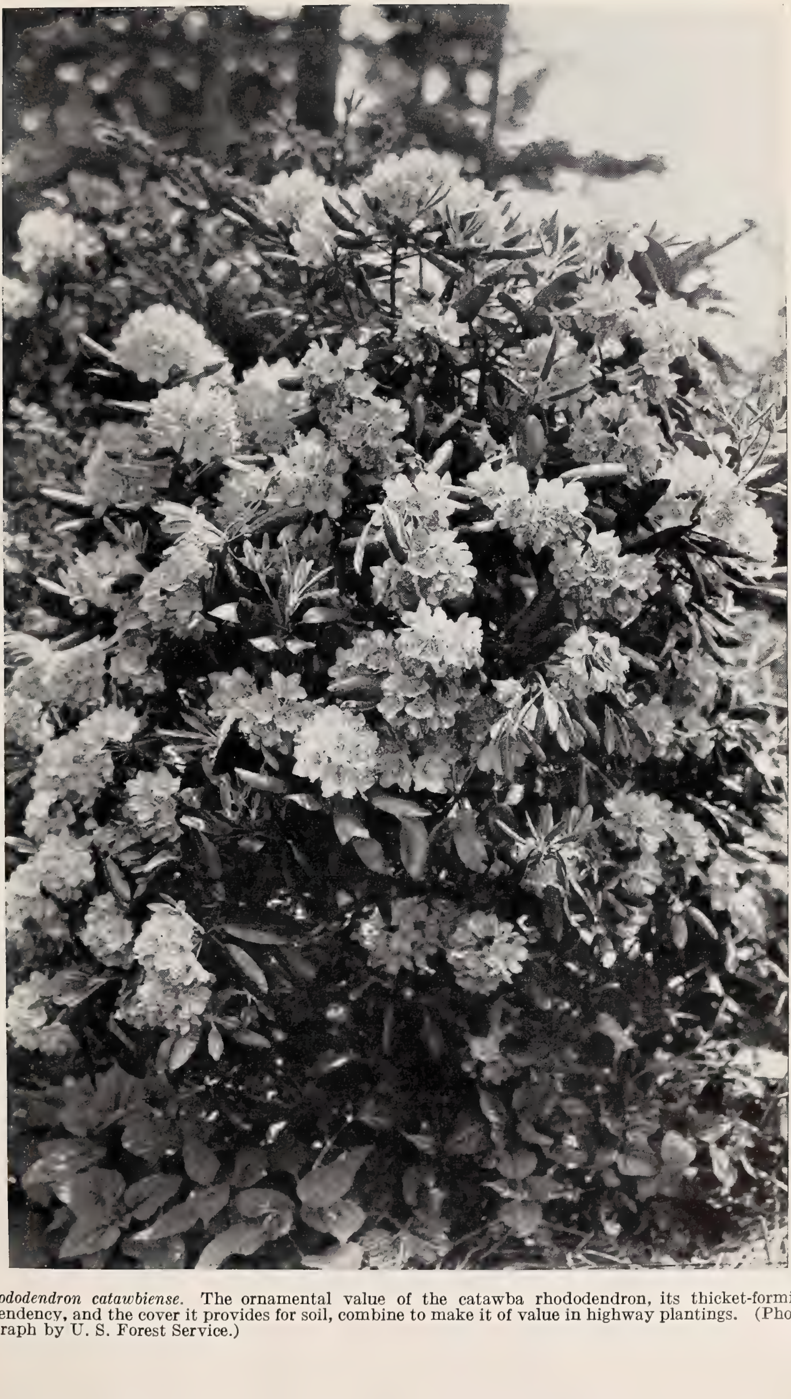
Rhus canadensis, see *Rhus aromatica.*

Rhus choriophylla Woot. and Standl.
Range: 11, 14.
Site: Dry, well-drained, sun.
Fruit: Drupe, available through winter.

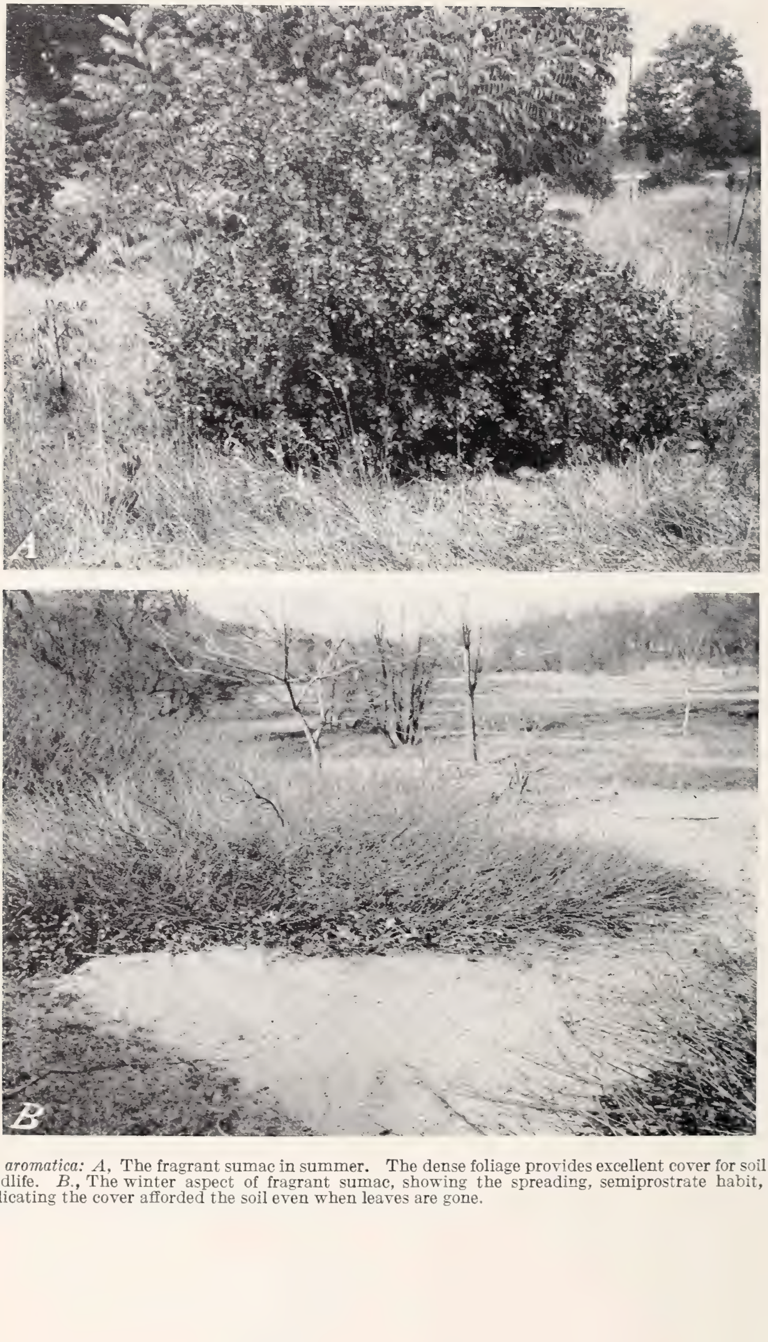
A small to large evergreen shrub.

Rhus cismontana, see *Rhus glabra.*

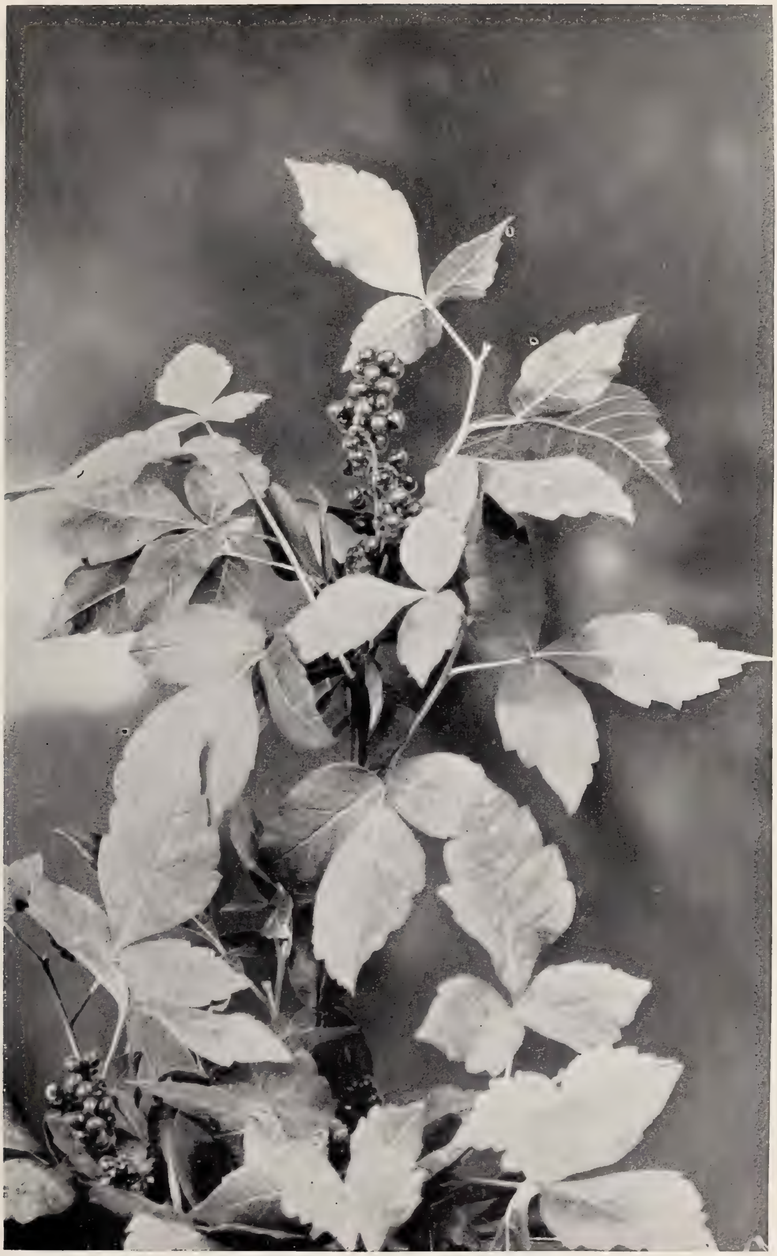
Rhus copallina L. **Dwarf sumac.**
Schmaltzia copallina (L.) Small.
Range: 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 32.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe; available September–October, persistent the year round.



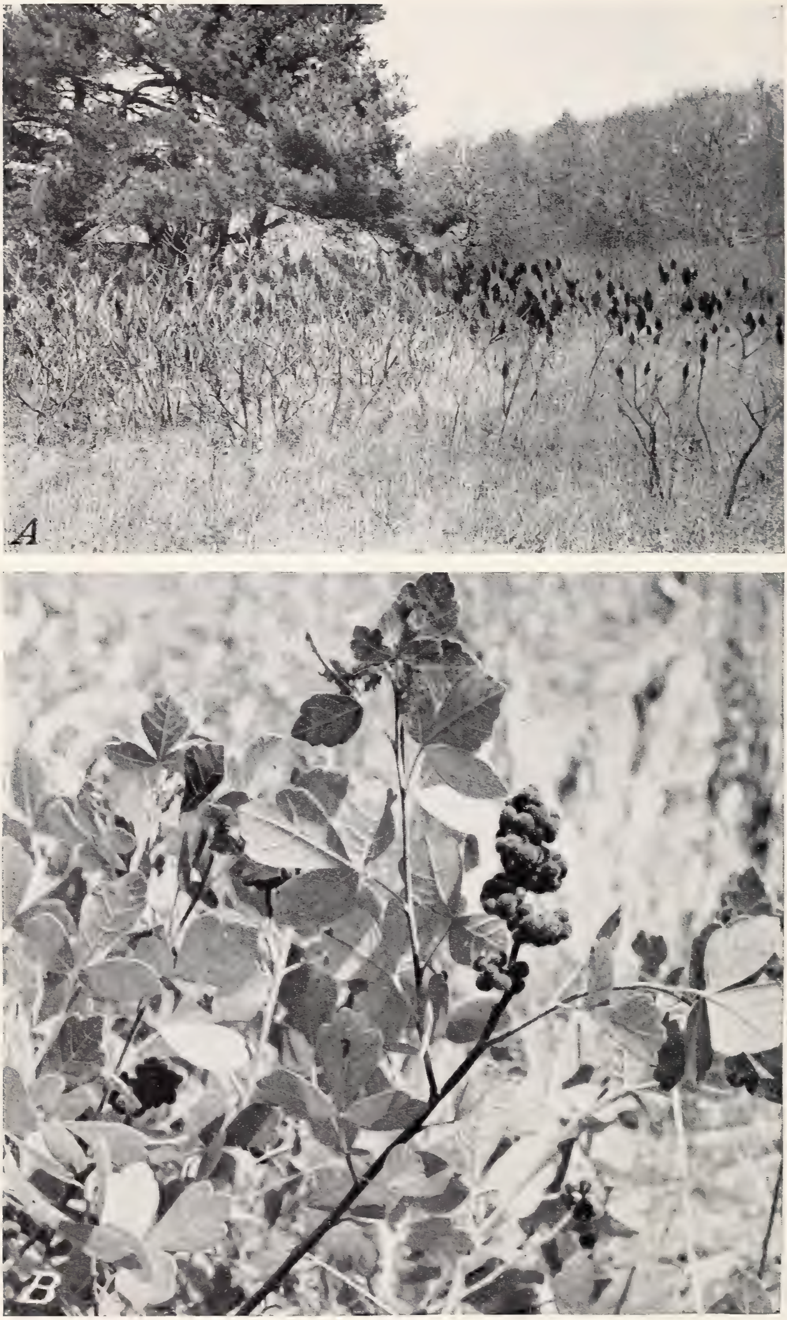
Rhododendron catawbiense. The ornamental value of the catawba rhododendron, its thicket-forming tendency, and the cover it provides for soil, combine to make it of value in highway plantings. (Photograph by U. S. Forest Service.)



Rhus aromatica: A, The fragrant sumac in summer. The dense foliage provides excellent cover for soil and wildlife. *B.,* The winter aspect of fragrant sumac, showing the spreading, semiprostrate habit, and indicating the cover afforded the soil even when leaves are gone.



Rhus aromatica. The ornamental fruit, useful for wildlife, enhances the value of fragrant sumac plantings in the control of erosion.



A, *Rhus glabra*. A typical sumac thicket furnishing food the year round for wildlife. Adaptable to poor soils, this plant may well aid in the control of erosion. *B*, A fruiting branch of *R. trilobata*, a species with great possibilities for planting in the arid parts of the country.

A small to large shrub or small to large tree; commonly forms thickets; occurs in slightly acid soils; trunks sometimes used for fence posts; 13,000–70,000 seeds per pound.

Var. *lanceolata* Gray, (*Rhus lanceolata* Gray, *Schmaltzia lanceolata* Small) occurs in region 11 where it commonly grows on dry, limestone soil.

Stomach records: Twenty species of birds, including ruffed grouse, bobwhite, sharp-tailed grouse, and lesser prairie chicken. *Observations:* Ring-necked pheasant; white-tailed deer.

Rhus cotinoides, see *Cotinus americanus.*

Rhus crenata, see *Rhus aromatica.*

Rhus crenatifolia, see *Rhus trilobata.*

Rhus desertorum, see *Rhus toxicodendron.*

Rhus diversiloba Torr. and Gray. **Poison oak.**

R. diversiloba radicans (Torr. and Gray) McNair, *R. lobata* Hook., *Toxicodendron diversilobum* (Torr. and Gray) Greene, *T. comarophyllum* Greene, *T. isophyllum* Greene.

Range: 1, 2, 3, 4, 5.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe; available September–October, commonly persistent.

A small to large shrub or occasionally a vine; often forms extensive thickets; somewhat aggressive; poisonous.

Stomach records: Thirty-three species of birds, including California quail. *Observations:* Three species of birds; of slight importance as browse for mule deer; black bear. Of importance as a honey plant. Not poisonous to livestock, fair cattle feed, especially in dry seasons.

Rhus emoryi, see *Rhus trilobata.*

Rhus eximia, see *Rhus toxicodendron.*

Rhus glabra L. (pl. 34, A). **Smooth sumac.**

R. albida Greene, *R. angustiarum* Lunell, *R. arbuscula* Greene, *R. arguta* Greene, *R. asplenifolia* Greene, *R. cismontana* Greene, *R. media* Greene, *R. nitens* Greene, *R. occidentalis* (Torr.) Blankenship, *R. sambucina* Greene, *R. sandbergii* (Vasey and Holz.) Greene, *R. tesselata* Greene, *Schmaltzia glabra* (L.) Small.

Range: 6, 7, 8, 9, 11, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe; available September–October persistent the year round.

A small to large straggling shrub; little branched; commonly thicket forming; grows on coal-stripped land in Illinois; commonly occurs in slightly acid soil; 27,000–32,000 seeds (with coats) per pound.

Stomach records: Thirty-two species of birds, including ruffed grouse, bobwhite, prairie chicken, mourning dove, and wild turkey. *Observations:* Seven species of birds including bobwhite, Hungarian partridge, ring-necked pheasant; a preferred food of wild turkey; white-tailed deer; a preferred food of cotton-tail rabbit.

Rhus hirta, see *Rhus typhina.*

Rhus integrifolia (Nutt.) Benth. and Hook. **Mahogany sumac.**

Neostyphonia integrifolia Shaf., *Styphonia integrifolia* Nutt.

Range: 5, 10.
Site: Dry, well-drained, sun.
Fruit: Drupe; available August–September.

A small to large evergreen shrub; forms remarkably dense thickets; tolerant of saline conditions; very drought resistant; will grow on extremely poor soils including sand and clay; lower procumbent branches root where they touch the ground; taproot and secondaries well developed and often extending 10 feet beyond the periphery of aerial portions; 6,800 seeds per pound.

Stomach records: Five species of birds; composed 8.4 percent of food of 84 road runners, being found in 31 percent of stomachs examined. *Observations:* California mule deer. Poor or worthless forage for livestock except occasionally goats.

Rhus kearneyi Barkl.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Drupe.

A small evergreen tree.

Rhus lanceolata, see *Rhus copallina.*

Rhus laurina Nutt. **Laurel sumac.**
Malosma laurina (Nutt.) Nutt.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Drupe, available in September, persistent.

A large evergreen shrub; root system spreading; produces a very dense shade; endures extreme heat and drought; seeds produced abundantly; coppices vigorously after fire; extremely sensitive to frost; 129.600 seeds per pound.

Stomach records: Six species of birds, including quail. *Observations:* Pallid wren tit; California mule deer.

Rhus lobata, see *Rhus diversiloba.*

Rhus longipes, see *Rhus toxicodendron.*

Rhus media, see *Rhus glabra.*

Rhus michauxii Sarg. **Michaux sumac.**
R. pumila Michx. *Schmaltzia michauxii* (Sarg.) Small.
Range: 28.
Site: Well-drained, sun.
Fruit: Drupe, available August–September.

A small stoloniferous shrub; commonly occurs on sandy soil; has been considered poisonous but recent manuals do not list it as such.

Rhus microcarpa, see *Rhus toxicodendron.*

Rhus microphylla Engelm.
Rhoeidium microphyllum Greene, *Rh. cinereum* Greene, *Rh. potosinum* Greene.
Range: 11, 16, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Drupe, available May–July.

A small or rarely a large shrub; densely branched; somewhat spinescent.

Stomach records: Cliff chipmunk. *Observations*: Sonora deer. Palatability to livestock low.

Rhus nitens, see *Rhus glabra.*

Rhus nortonii, see *Rhus aromatica.*

Rhus occidentalis, see *Rhus glabra.*

Rhus osterhoutii, see *Rhus trilobata.*

Rhus ovata Wats. (pl. 35). **Sugar sumac.**
Neostyphonia ovata (Wats.) Abrams.
Range: 5, 10, 11.
Site: Dry, well-drained, sun.
Fruit: Drupe, available August–September, persistent.

A large evergreen shrub; casts a dense shade; coppices rapidly after burning; thicket forming; 18,700 seeds per pound.

Observations: California mule deer. Worthless or poor browse for livestock, except occasionally for goats.

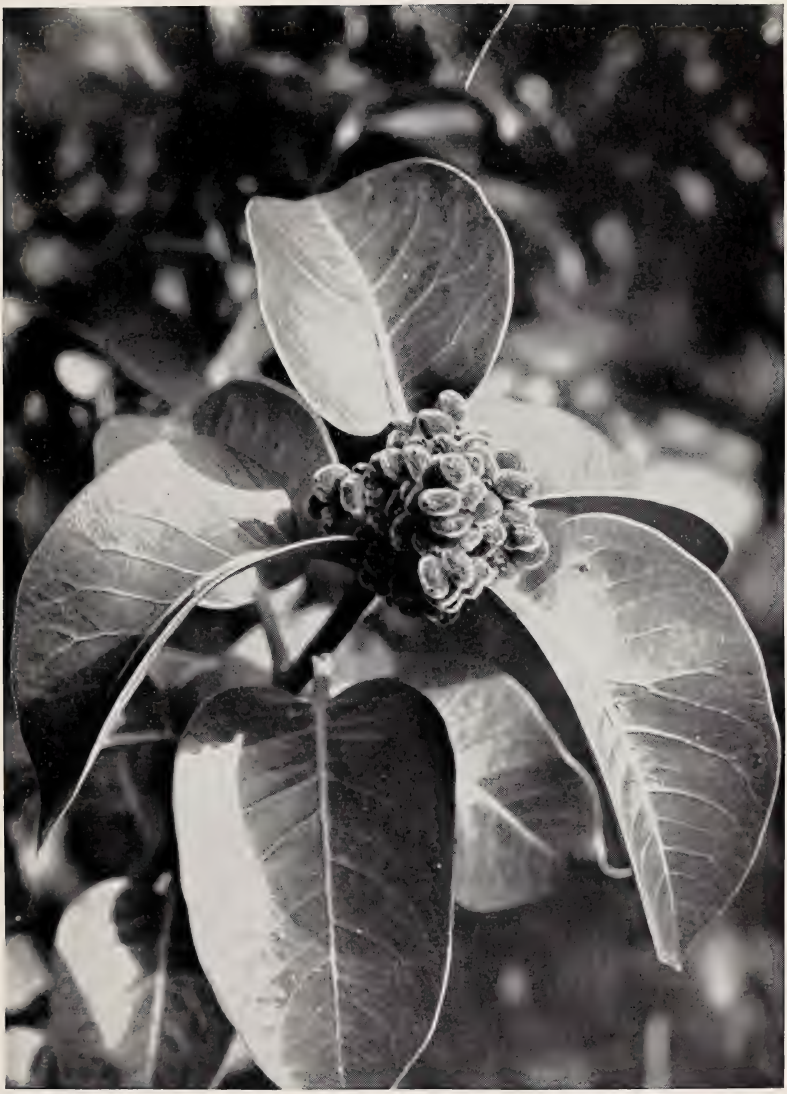
Rhus oxyacanthoides, see *Rhus trilobata.*

Rhus pulvinata, see *Rhus typhina.*

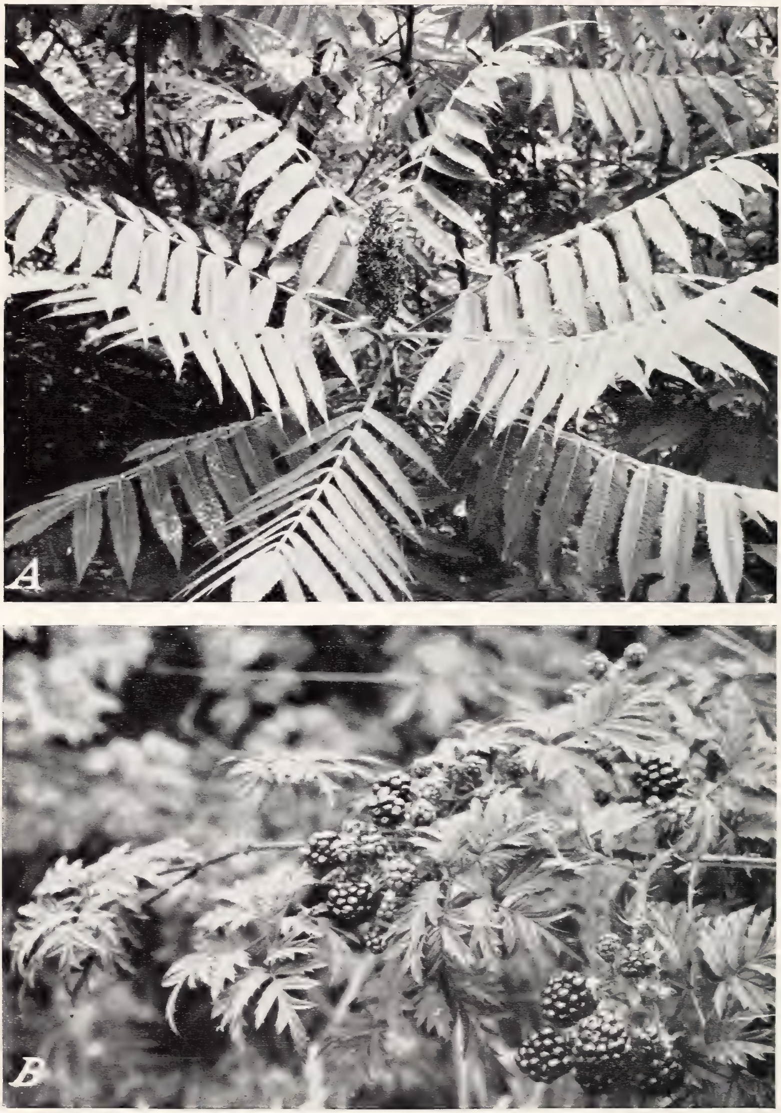
Rhus pumila, see *Rhus michauxii.*

Rhus quercifolia (Michx.) Steud.
R. toxicodendron quercifolia Michx., *Toxicodendron quercifolium* (Michx.) Greene.
Range: 20, 25, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe.

A small poisonous shrub.



Rhus ovata, a species of great importance as protection for soil and cover for wildlife. The utilization of the fruit is as yet unrecorded.



A, *Rhus typhina.* The staghorn sumac fruit, while eaten by numerous birds, is probably a last resort. The thickets it forms recommend it for erosion-control planting. *B*, *Rubus laciniatus.* The large, thorny hummocks formed by this species are of outstanding value as wildlife cover. In the Northwest its relative freedom from disease will permit its use in erosion-control planting.

Rhus radicans, see *Rhus toxicodendron.*

Rhus rydbergii, see *Rhus toxicodendron.*

Rhus sambucina, see *Rhus glabra.*

Rhus sandbergii, see *Rhus glabra.*

Rhus tesselata, see *Rhus glabra.*

Rhus toxicodendron L. **Poison-ivy**

R. desertorum Lunell, *R. eximia* Standl., *R. longipes* Greene, *R. microcarpa* Steud., *R. radicans* L., *R. rydbergii* Small, *R. toxicodendron radicans* Dippel, *Toxicodendron radicans* (L.) Kuntze, *T. biternatum* Greene, *T. eximium* Greene, *T. fothergilloides* Lunell, *T. hesperinum* Greene, *T. macrocarpum* Greene, *T. negundo* Greene, *T. punctatum* Greene, *T. rufescens* Greene, *T. rydbergii* (Small) Greene.

Range: 2, 6, 7, 8, 9, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe, available September–November.

A small to large poisonous shrub or vine; very variable in habit, from a small, nearly herbaceous shrub to a vigorous, high-climbing vine. This species has been much broken up as the synonomy indicates, but good botanical characters separating the forms as species do not appear to be satisfactory. A study of the forms in Indiana by Dream (*162*) showed that the low, erect forms are branches of underground stems; that the thick-leaved forms are always found in places exposed to heavy winds and direct sunlight; and that the hairy-fruited forms are rare, distributed throughout the area, and without other characters to distinguish them.

Stomach records: Sixty species of birds including ruffed grouse, bobwhite, wild turkey, sharp-tailed grouse, ring-necked pheasant, and greater prairie chicken; composed 0.8 percent of fall food of prairie chicken in Wisconsin. *Observations*: Nineteen species of birds including ring-necked pheasant; white-tailed deer; leaves refused by captive marsh rabbits.

Rhus trilobata Nutt. (pl. 34, *B*). **Lemonade sumac.**

R. canadensis trilobata (Nutt.) Gray, *R. crenatifolia* Schlecht., *R. emoryi* Woot., *R. osterhoutii* Rydb., *R. oxyacanthoides* (Greene) Rydb., *R. trilobata mollis* Greene, *R. utahensis* Good., *Schmaltzia trilobata* (Nutt.) Small, *S. affinis* Greene, *S. anisophylla* Greene, *S. bakeri* Greene, *S. cognata* Greene, *S. cruciata* Greene, *S. emoryi* Greene, *S. glabrata* Greene, *S. glauca* Greene, *S. glomerata* Greene, *S. leiocarpa* Greene, *S. malacophylla* Greene, *S. oxyacanthoides* Greene, *S. pulchella* Greene, *S. quercifolia* Greene, *S. ribifolia* Greene, *S. scaberula* Greene, *S. simplicifolia* Greene, *S. straminea* Greene, *S. subpinnata* Greene.

Range: 1, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 19, 20, 22, 24, 25.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe, available the year round.

A small shrub; roots very long; sometimes thicket forming; under natural conditions endures extreme drought; 10,000–25,0000 seeds per pound. This species has been much broken up, and the segregates recombined as the synonomy indicates.

Stomach records: Nineteen species of birds, including ruffed grouse, bobwhite, valley, Gambel and western quail, greater prairie chicken and lesser prairie chicken. *Observations:* Ring-neck pheasant, sage hen, scaled quail; mountain sheep; of slight importance as browse for mule deer. Worthless to good forage for stock; of most value in Arizona and Colorado, less so in Utah.

Rhus typhina Torner (pl. 36, *A*). **Staghorn sumac.**

R. hirta (L.) Sudw., *Datisca hirta* L., *Schmaltzia hirta* (L.) Small.

Range: 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe; available in September, persistent the year round.

A large shrub to small tree; sprouts persistently from the roots after cutting or injury; forms loose thickets; 50,000 seeds per pound.

A plant more or less intermediate between this and *R. glabra* has been described as *R. pulvinata* Greene.

Stomach records: Fourteen species of birds, including ruffed grouse, bobwhite, ring-necked pheasant and mourning dove; eastern skunk. *Observations*: Four species of birds including sharp-tailed grouse; important food of ring-necked pheasant in southern Michigan; closely browsed by moose on Isle Royale; white-tailed deer, cottontail rabbit; ninth most important preferred winter food of deer in Massachusetts. Resistant to grazing.

Rhus utahensis, see *Rhus trilobata.*

Rhus venenata, see *Rhus vernix.*

Rhus vernix L. **Poison sumac.**
R. venenata DC., *Toxicodendron vernix* (L.) Kuntze, *T. pinnatum* Mill.
Range: 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Moist, sun.
Fruit: Drupe; available in September, persistent.

A large shrub to small or large tree; foliage not dense; rather loosely branched; poisonous.

Stomach records: Sixteen species of birds, including ruffed grouse and ring-necked pheasant. *Observations:* Five species of birds; an important food of ring-necked pheasant and bobwhite; cottontail rabbit.

Rhus virens Lindh. **Evergreen sumac.**
Schmaltzia virens (Lindh.) Small.
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Drupe, available in September.

A small to large shrub or small tree; evergreen; commonly occurs on limestone soils; grows in extremely difficult positions; may often be prostrate.

Ribes spp. **Gooseberry, currant.**

These species are alternate hosts of the white-pine blister rust. Various State and Federal laws restrict or prohibit the movement of *Ribes* as well as the five-leaved pines, and any operators interested in planting these should get in touch with the United States Bureau of Entomology and Plant Quarantine, as well as with the officers in their particular State who are concerned with the movement of the shrubs and trees (State entomologists, plant-quarantine officers, and horticulturists).

At the present time, while all species have not been tested, no native species is known to be resistant to the blister rust. Nine hundred feet is a safe distance to plant *Ribes* (except the cultivated black currant) away from the pines. The spores of the rust have been known to infect cultivated black currant 150 miles or more from the pines, and the statement has been made (*154*) that if there were no cultivated black currants, the disease would not be as widespread as it is. Reference to *Pinus* will show which of those species have five needles.

The genus is often divided into two, *Ribes* and *Grossularia*, currants and gooseberries, respectively. There appears yet to be considerable difference of opinion as to whether the two should be combined or separated.

Stomach records (in addition to specific records): Thirty-three species of birds, including dusky grouse, mourning dove, and Richardson's grouse; mountain sheep, black-tailed deer, coyote, northern chipmunk, pale chipmunk, and rufous-tailed chipmunk. *Observations* (in addition to specific records): Seven species of birds including dusky grouse, prairie sharp-tailed grouse, Gambel quail; Say chipmunk, painted chipmunk, gray-footed chipmunk, lesser Colorado chipmunk, Arizona chipmunk, cliff squirrel, golden-mantled ground squirrel, alpine chipmunk, eastern chipmunk, western chipmunk, Allen's chipmunk, Siskiyou chipmunk, pica, and porcupine; formed a prominent share of the midsummer food of skunks in New York. Fairly to moderately palatable to livestock, except goats, and of considerable forage significance on some ranges.

Ribes acerifolium Howell
R. howellii Greene.
Range: 4.
Site: Well-drained, sun.
Fruit: Berry.

A small shrub.

Ribes affine, see *Ribes laxiflorum.*

Ribes amarum McClatch. **Bitter gooseberry.**
Grossularia amara (McClatch.) Cov. and Britt.
Range: 4.
Site: Dry, well-drained, shade.
Fruit: Berry.
A small to large, spiny shrub; flowers March–April.

Ribes americanum, see also *Ribes laxiflorum.*

Ribes americanum Mill. **Black currant.**
R. floridum L'Her.
Range: 12, 13, 14, 15, 18, 21, 22, 23, 24, 25, 27, 28.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available July–August.
A small, unarmed shrub; flowers April–May; closely related to *R. nigrum* of Europe, the most dangerous host of the white-pine blister rust.
Observations: Ring-necked pheasant; eagerly eaten by songbirds.

Ribes ascendens, see *Ribes nevadense.*

Ribes aureum Pursh. **Golden currant.**
Chrysobotrya aurea (Pursh) Rydb.
Range: 1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 15, 22, 23.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available June–July.
A small to large shrub; flowers April–May.
Observations: Ring-necked pheasant; of fair importance as browse for mule deer. Poor to fair browse for livestock.

Ribes binominatum Heller. **Ground gooseberry.**
Grossularia binominata (Heller) Cov. and Britt.
Range: 4.
Site: Well-drained, sun.
Fruit: Berry.
A small, trailing, spiny shrub; flowers in June.

Ribes bracteosum Dougl. **Stink currant.**
Range: 1, 2, 4.
Site: Moist, shade.
Fruit: Berry.
A small to large shrub; flowers May–June.

Ribes californicum Hook. and Arn. **Hillside gooseberry.**
Grossularia californica (Hook. and Arn.) Cov. and Britt.
Range: 1, 4, 5, 10.
Site: Dry, sun.
Fruit: Berry.
Commonly a small shrub, rarely a large shrub; spiny and compact; flowers January–April; berry small and usually single.

Ribes cereum Dougl. **Wax currant.**
R. inebrians Lindl., *R. pumilum* Nutt., *R. churchii* Nels.
Range: 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16.
Site: Dry, sun.
Fruit: Berry, available June–August.
A small to large, unarmed, much-branched shrub; flowers June–August.
Observations: Blue, spruce, and Richardson's grouse, chickadee; eaten by many songbirds; an important food of chipmunks in California; California mule deer. Of some importance as forage for livestock.

Ribes churchii, see *Ribes cereum.*

Ribes ciliosum, see *Ribes triste.*

Ribes cognatum Greene.
Grossularia cognata (Greene) Cov. and Britt.
Range: 7, 8, 9.
Site: Moist, sun.
Fruit: Berry.
A large, spiny shrub.

Ribes coloradense Cov. **Colorado currant.**
Range: 13, 14.
Site: Well-drained, sun.
Fruit: Berry.
A small, unarmed shrub; branches decumbent or prostrate.

Ribes curvatum Small. **Georgia gooseberry.**
Grossularia curvata (Small) Cov. and Britt.
Range: 28, 29.
Site: Dry, well-drained, sun.
Fruit: Berry, available in July.
A small, spiny shrub.

Ribes cynosbatii L. **Pasture gooseberry.**
R. gracile Michx., *Grossularia cynosbatii* (L.) Mill.
Range: 21, 22, 23, 24, 25, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available April–August.
A small, spiny shrub; flowers April–June.
Observations: Red squirrel, cottontail rabbit.

Ribes divaricatum Dougl. **Straggly gooseberry.**
R. sucksdorfii Heller, *Grossularia divaricata* (Dougl.) Cov. and Britt., *G. parishii* Cov. and Britt.
Range: 1, 2, 4, 5.
Site: Well-drained, moist, sun.
Fruit: Berry.
A large, spiny, straggling shrub; flowers in April.

Ribes erythrocarpum Cov. and Leiberg.
Range: 4.
Site: Well-drained, sun.
Fruit: Berry.
A small, unarmed shrub; branches trailing and rooting.

Ribes floridum, see *Ribes americanum.*

Ribes glandulosum Grauer. **Skunk currant.**
R. prostratum L'Her.
Range: 23, 24, 26, 27.
Site: Moist, sun, shade.
Fruit: Berry.
A small shrub; flowers May–June; decumbent or spreading; spiny or unarmed.

Ribes glaucescens, see *Ribes nevadense.*

Ribes gracile, see *Ribes cynosbatii.*

Ribes grantii, see *Ribes nevadense.*

Ribes hallii, see *Ribes viscosissimum.*

Ribes hesperium McClatch.
Grossularia hesperia (McClatch.) Cov. and Britt.
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Berry.
A small to large spreading, spiny shrub.

Ribes hirtellum Michx. **Low wild gooseberry.**
R. saxosum Hook., *Grossularia hirtella* (Michx.) Spach.
Range: 15, 18, 21, 23, 24, 26, 27.
Site: Moist, shade.
Fruit: Berry, available in July.
A small, spiny shrub.

Ribes hittellianum, see *Ribes nevadense.*

Ribes howellii, see *Ribes acerifolium.*

Ribes hudsonianum Rich. **Hudson Bay currant.**
Range: 23, 24.
Site: Moist, shade.
Fruit: Berry, available July–August.
A small to large, unarmed shrub; flowers May–June.

Ribes indecorum Eastw.
Range: 5.
Site: Well-drained, sun.
Fruit: Berry.
A large, loosely-branched, unarmed shrub.

Ribes inebrians, see *Ribes cereum.*

Ribes inerme Rydb. **Whitestem gooseberry.**
Grossularia inermis (Rydb.) Cov. and Britt.
Range: 4, 6, 7, 8, 9, 11, 12, 13, 14.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available August–September.
A small to large shrub; flowers in May; spiny or unarmed. Forage value for sheep, fair.

Ribes irriguum Dougl.
Grossularia irrigua (Dougl.) Cov. and Britt.
Range: 6, 7, 12.
Site: Moist, sun, shade.
Fruit: Berry.
A small to large, spiny shrub.

Ribes lacustre (Pers.) Poir. **Swamp currant.**
R. parvulum Rydb., *Lymnobotrya parvula* Rydb., *L. lacustris* (Pers.) Rydb.
Range: 4, 12, 13, 14, 23, 24, 26, 27.
Site: Moist, sun, shade.
Fruit: Berry, available in August.
A small, spiny shrub; flowers May–June; stems prostrate or ascending.

Ribes lasiantha, see *Ribes leptanthus.*

Ribes laxiflorum, see also *Ribes odoratum.*

Ribes laxiflorum Pursh. **Western black currant.**
R. americanum Pall., not Mill., *R. affine* Dougl.
Range: 1, 4, 12, 13.
Site: Moist, shade.
Fruit: Berry.
A small, unarmed shrub; flowers in April; often decumbent and covering large areas.

Ribes lentum, see *Ribes montigenum.*

Ribes leptanthum Gray. **Alpine gooseberry.**
Grossularia leptantha (Gray) Cov. and Britt.
Range: 9, 11, 13, 14.
Site: Dry, well-drained, sun, shade.
Fruit: Berry.
A small to large spiny shrub.
Var. *lasiantha* (Greene) Jeps. (*R. lasiantha* Greene, *Grossularia lasianthum* (Greene) Cov. and Britt.) occurs in region 4 and is smaller than the species.
Stomach records: Black-tailed deer.

Ribes lobbii Gray. **Gummy gooseberry.**
Grossularia lobbii (Gray) Cov. and Britt.
Range: 1, 2.
Site: Well-drained, sun.
Fruit: Berry.
A large, spiny shrub; flowers in June.
Stomach records: Lewis woodpecker (?)

Ribes longiflorum, see *Ribes odoratum.*

Ribes malvaceum Smith. **California black currant.**
R. purpurascens Heller.
Range: 3, 4, 5.
Site: Dry, well-drained, sun, shade.
Fruit: Berry.
A large unarmed, many-stemmed shrub; flowers December–April.
Observations: California mule deer.

Ribes marshallii Greene. Hupa gooseberry.
Grossularia marshallii (Greene) Cov. and Britt.
Range: 4.
Site: Well-drained, sun.
Fruit: Berry.

A small, spiny shrub; flowers in July; low and spreading; forms matlike colonies.

Ribes menziesii Pursh. Menzies gooseberry.
Grossularia menziesii (Pursh) Cov. and Britt.
Range: 1.
Site: Well-drained, sun, shade.
Fruit: Berry.

A large, spiny, loosely branched shrub; flowers February–April.
Stomach records: Sooty grouse. *Observations:* Blue grouse.

Ribes mescalerium Cov.
Range: 11, 14.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small to large, unarmed shrub, with insipid fruit.

Ribes missouriense Nutt. Missouri gooseberry.
Grossularia missouriensis (Nutt.) Cov. and Britt.
Range: 21, 22, 23, 25.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available July–September.

A small to large, spiny shrub; flowers in May; berries very large.

Ribes mogollonicum, see *Ribes wolfii.*

Ribes molle, see *Ribes montigenum.*

Ribes montigenum McClatch. Mountain gooseberry.
R. lentum (Jones) C. and R., *R. molle* Howell, not Poepp., *Lymnobotrya montigena* (McClatch.) Rydb.
Range: 4, 10, 11, 12, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small, spiny shrub; flowers in July; straggling and much-branched. Of more than average palatability to livestock.

Ribes nevadense Kellogg. Nevada currant.
R. variegatum Nels., *R. ascendens* Eastw., *R. hittellianum* Eastw., *R. glaucescens* Eastw., *R. grantii* Heller.
Range: 4, 10, 12, 13.
Site: Well-drained, moist, sun, shade.
Fruit: Berry.

A small to large, diffusely branched, unarmed shrub; flowers May–July.
Observations: Of outstanding importance as browse for mule deer; mountain beaver. Somewhat browsed by sheep in California.

Ribes niveum Lindl. Snow gooseberry.
Grossularia nivea (Lindl.) Cov. and Britt.
Range: 7, 8, 9, 12, 13.
Site: Dry, sun.
Fruit: Berry.

A small to large, spiny shrub.

Ribes odoratum Wendl. Golden currant.
R. laxiflorum Nutt., *R. longiflorum* Nutt., *Chrysobotrya odorata* (Wendl.) Rydb.
Range: 15, 16, 18, 19, 20, 22, 23, 25.
Site: Dry, well-drained, sun, shade.
Fruit: Berry.

A small to large, unarmed shrub; flowers April–May.

Ribes oxyacanthoides L. Northern gooseberry.
Grossularia oxyacanthoides (L.) Mill.
Range: 4, 12, 15, 18, 21, 23, 24, 26, 27.
Site: Moist, sun.
Fruit: Berry, available in August.

A small, spiny shrub.
Stomach records: Bobwhite.

Ribes parvulum, see *Ribes lacustre.*

Ribes petiolare Dougl.
Range: 4, 12, 13.
Site: Well-drained, sun.
Fruit: Berry.
A small to large, unarmed shrub.

Ribes pinetorum Greene. **Orange gooseberry.**
Grossularia pinetorum (Greene) Cov. and Britt.
Range: 10, 14.
Site: Well-drained, sun, shade.
Fruit: Berry.
A small to large, spiny shrub; very ornamental in bloom.

Ribes prostratus, see also *Ribes glandulosum.*

Ribes prostratum L'Her. **Skunk currant.**
Range: 23, 24, 26, 27.
Site: Moist, shade.
Fruit: Berry, available in July.
A small shrub with reclining stems.

Ribes pumilum, see *Ribes cereum.*

Ribes purpurascens, see *Ribes malvaceum.*

Ribes quercetorum Greene. **Rock gooseberry.**
Grossularia quercetorum (Greene) Cov. and Britt.
Range: 3, 4, 5, 14.
Site: Dry, well-drained, sun.
Fruit: Berry.
A small, spiny shrub; flowers February–March.

Ribes reniforme Nutt.
Range: 12.
Site: Well-drained, sun.
Fruit: Berry.
A small or, more generally, a large shrub.

Ribes roezlii Regel. **Sierra gooseberry.**
R. wilsoniannum Greene, *Grossularia roezlii* (Regel) Cov. and Britt.
Range: 4, 5, 10.
Site: Dry, well-drained, sun.
Fruit: Berry.
A small, spiny shrub; flowers May–July; loosely branched; fruit produced abundantly.
Observations: Of outstanding importance as browse for mule deer. A fair sheep and cattle browse.

Ribes rotundifolium Michx. **Roundleaf gooseberry.**
Grossularia rotundifolia (Michx.) Cov. and Britt.
Range: 27.
Site: Dry, well-drained, sun.
Fruit: Berry, available June–August.
A small shrub; flowers May–July; spiny or unarmed.

Ribes sanguineum Pursh. **Red-flowered currant.**
Range: 1, 2, 4.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available July–August.
A large, unarmed shrub; flowers April–June; several varieties are in cultivation.
Stomach records: Sooty grouse. *Observations:* Three species of birds, including blue grouse. Good sheep and fair cattle browse.

Ribes saxosum, see *Ribes hirtellum.*

Ribes sericeum Eastw. **Lucia gooseberry.**
Grossularia sericea (Eastw.) Cov. and Britt.
Range: 1.
Site: Well-drained, sun.
Fruit: Berry.
A small, prickly shrub; flowers February–March; berries large.

Ribes setosum Lindl. (pl. 37, *A*). **Missouri gooseberry.**
Grossularia setosa (Lindl.) Cov. and Britt.
Range: 12, 15, 18.
Site: Dry, well-drained, sun.
Fruit: Berry, available June–August.

A small, spiny shrub; flowers in May.
Observations: Moose.

Ribes speciosum Pursh. **Garnet gooseberry.**
Grossularia speciosa (Pursh) Cov. and Britt.
Range: 1, 5.
Site: Well-drained, shade.
Fruit: Berry.

A large, spiny shrub; flowers April–May; nearly or quite evergreen; very ornamental in bloom.
Observations: California mule deer.

Ribes stanfordii, see *Ribes velutinum.*

Ribes suksdorfii, see *Ribes divaricatum.*

Ribes triste Pall. **American red currant.**
R. ciliosum Howell.
Range: 4, 12, 15, 18, 21, 23, 24, 26, 27, 28.
Site: Moist, sun, shade.
Fruit: Berry.

A small unarmed shrub; flowers June–July; the prostrate or ascending branches root.

Ribes variegatum, see *Ribes nevadense.*

Ribes velutinum Greene. **Plateau gooseberry.**
R. stanfordii Elmer, *Grossularia velutina* (Greene) Cov. and Britt.
Range: 4, 9, 10, 13, 14.
Site: Dry, well-drained, sun, shade.
Fruit: Berry.

A small to large shrub; flowers May–June; spiny or unarmed.
Observations: Of slight importance as browse for mule deer.

Ribes viburnifolium Gray. **Island gooseberry.**
Range: 5.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small, evergreen, straggling shrub; flowers in January.

Ribes victoris Greene. **Victor gooseberry**
Grossularia victoris (Greene) Cov. and Britt.
Range: 1, 3.
Site: Well-drained, shade.
Fruit: Berry.

A small to large, spiny shrub; flowers in March.

Ribes viscosissimum Pursh. **Sticky currant.**
R. hallii Jancz.
Range: 4, 9, 11, 12, 13, 14.
Site: Well-drained, sun, shade.
Fruit: Berry.

A small, unarmed shrub; flowers June–July; root system as much as 4 feet deep, not fibrous.
Stomach records: Ruffed grouse, Richardson's grouse. *Observations:* Of slight importance as browse for mule deer; mountain beaver. Palatability good, as browse for livestock.

Ribes watsonianum Koehne. **Watson gooseberry.**
Grossularia watsoniana (Koehne) Cov. and Britt.
Range: 4.
Site: Well-drained, sun.
Fruit: Berry.

A small to large, spiny shrub. Highly palatable to livestock.

Ribes wilsonianum, see *Ribes roezlii.*

Ribes wolfii Rothr. **Rothrock currant.**
R. mogollonicum Greene.
Range: 13, 14.
Site: Well-drained, moist, sun.
Fruit: Berry, available in August.
A small to large shrub. Fairly good cattle browse in Utah.

Ricinella vaseyi (Coult.) Coult. and Fish.
Adelia vaseyi Coult.
Range: 17.
Site: Dry, sun.
Fruit: Capsule.
A small to large dioecious shrub; sometimes spiny; leaves few.

Ricinophyllum horridum, see *Oplopanax horridum.*

Ricinus communis L. **Castor-bean.**
Range: 3, 5, 10, 17, 20, 30.
Site: Well-drained, sun.
Fruit: Capsule, available August–September.
A large shrub or rarely a small tree; probably introduced from Africa, but more or less naturalized in the regions indicated; herbaceous, and not escaping northwards.
Stomach records: Bobwhite, mourning dove.

Riddelia cooperi, see *Psilostrophe cooperi.*

Robinia spp. **Locusts.**
Stomach records (in addition to specific records): Seven species of birds including ruffed grouse, bobwhite, western quail, and mourning dove.

Robinia boyntonii Ashe.
R. hispida rosea Hort.
Range: 27.
Site: Well-drained, sun.
Fruit: Legume.
A large shrub or rarely a large tree; flowers May–June; probably does not produce fruit; very handsome when in flower.

Robinia elliottii (Chapm.) Ashe.
R. hispida elliottii Chapm.
Range: 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Legume.
A large, spiny shrub; flowers May–June; occurs on sandy and other soils.

Robinia fertilis Ashe.
Range: 27.
Site: Well-drained, sun.
Fruit: Legume.
A small to large, stoloniferous shrub; fruit freely produced; spiny or unarmed.

Robinia grandiflora Ashe.
Range: 27.
Site: Well-drained, sun.
Fruit: Legume, available in July.
A small to large shrub; flowers April–May; rarely spiny; easily propagated by root suckers which are extensively produced; occurs in sandy and other soils.

Robinia hartwigii Koehne.
R. viscosa hartwigii (Koehne) Ashe.
Range: 27, 28,
Site: Well-drained, sun.
Fruit: Legume.
A large, spiny shrub; flowers in June.

Robinia hispida L. **Rose-acacia.**
Range: 25, 27, 28.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Legume, available in September.
A small to large, stoloniferous shrub; spiny, or more commonly unarmed; foliage not dense; tolerant of arid conditions; commonly produces little fruit; propagates extensively by suckering.

Robinia kelseyi Cowell.
Range: 27.
Site: Well-drained, sun.
Fruit: Legume.

A small to large, spreading, spiny shrub; flowers May–June; 80,640 seeds per pound.

Robinia longiloba Ashe.
Range: 27, 28.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small shrub; flowers in May; spiny or unarmed; seldom produces fruit, propagates extensively by suckering, but never forms extensive thickets. Possibly a hybrid between *R. boyntonii* and *R. grandiflora*.

Robinia luxurians, see *Robinia neomexicana*.

Robinia nana Ell.
R. hispida nana (Ell.) Torr. and Gray.
Range: 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small shrub; occurs in sandy and other soils; spiny or unarmed; usually little branched.

Robinia neomexicana Gray. **New Mexican locust.**
Range: 9, 10, 11, 14.
Site: Dry, well-drained, moist, sun.
Fruit: Legume, available September–October.

A small to large, spiny shrub; thicket forming on drier, rockier slopes; hardy as far northward as New England; in cultivation in the Eastern States and western Europe; 21,800 seeds per pound.

Var. *luxurians* Dieck, (*R. luxurians* (Dieck) Rydb.) is a small tree occurring within the range of the species.

Stomach records: Gambel quail (?); mountain sheep, porcupine, black-tailed deer; Coeur d'Alene chipmunk. *Observations:* Porcupine, mule deer. An important goat browse; somewhat cropped by horses and cattle without harmful effects.

Robinia pallida Ashe.
Range: 27.
Site: Well-drained, sun.
Fruit: Legume.

More commonly a small, or sometimes a large shrub; reproduces by suckers.

Robinia pedunculata Ashe.
Range: 27.
Site: Dry, well-drained, sun.
Fruit: Legume.

A large shrub; spiny or unarmed. Possibly a hybrid between *R. hispida* and *R. boyntonii*.

Robinia pseudoacacia L. **Black locust.**
Range: 1, 2, 3, 4, 5, 6, 7, 8, 12, 15, 16, 20, 21, 22, 23, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Legume, available September–April.

A large, short-lived tree; somewhat tolerant of alkali; much attacked by locust borer, but apparently the greater the growth rate the less borer trouble; wood of importance commercially, particularly for fence posts; root system extremely shallow; easily transplanted when young; makes its best growth on fertile soil; on very poor soils makes poor growth and does not reach large size; rapid growing on good soils, slow growing on poor soils; seriously injured by fungi; not resistant to fire; coppices freely; 20,000–26,000 seeds per pound. Range much extended by cultivation; original range not clear.

Var. *rectissima* Raber, the shipmast locust, is a tree to 100 feet, occurring on the richer soils of the northern and western parts of Long Island, and locally in New York and Massachusetts. The trunk is columnar, very straight and yields a wood which is harder and more durable than that of the species. It is longer lived than the species, produces almost no seed, and propagation is by root cuttings and root sprouts. May possibly be more resistant to the attacks of the borer, and the damage is confined to branches rather than trunks. Some 16 other varieties are known in cultivation.

Stomach records: Five species of birds, including bobwhite, and mourning dove; gray fox, opossum, white-tailed deer. *Observations:* Four species of birds; ranks thirteenth on the list of quail food plants in the Southeast; an important food of the bobwhite in Oklahoma; ring-necked pheasant; cottontail rabbit, snowshoe hare, white-tailed deer. Young shoots and bark poisonous to all livestock; leaves not poisonous; poisoning cases not infrequent.

Robinia rusbyi Woot. and Standl.
Range: 14.
Site: Well-drained, sun.
Fruit: Legume.

A large shrub to small tree.

Robinia speciosa Ashe.
Range: 27.
Site: Well-drained, sun.
Fruit: Legume.

Commonly a small shrub, rarely a large one; much branched; unarmed; propagates by root suckers.

Robinia subvelutina Rydb.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Legume.

A small spiny shrub.

Robinia viscosa Vent. **Clammy locust.**
Range: 27, 28, 29.
Site: Well-drained, sun.
Fruit: Legume, available in September, persistent through the winter.

A small to large, spreading tree; extensively naturalized in the eastern United States.

Rosa spp. **Wild roses.**

Because of the difficulty of identifying the various species and the fact that at present there appears to be considerable confusion in the taxonomy of roses, the species are here omitted except for the general characterization of the genus.

Their erosion-control value lies in the fact that many are climbing, sprawling, or thicket-forming species, often making a rather dense cover on the surface of the soil, with the branches usually rooting where they touch the ground. Nonclimbing species may produce suckers at various distances from the crown. Some species have dense foliage, but others have open foliage. Some may often be weedy in fields. The best procedure, in working with roses, as with the hawthorns and blackberries, is to choose for planting those species in any given region which seem to be doing the best job of erosion control under natural conditions.

Among the thicket-forming species may be mentioned *R. californica* C. and S., *R. carolina* L., *R. laevigata* (the Cherokee rose), *R. nutkana* Presl, and *R. pisocarpa* Gray.

Species with more or less outstanding livestock browse records include *R. acicularis* Lindl., *R. californica* C. and S., *R. eglanteria* L. (*R. rubiginosa* L.), *R. fendleri* Crep. (probably the most important browse species of the genus), *R. gymnocarpa* Nutt., *R. macounii* Greene, *R. macrantha* Greene, *R. manca* Greene, *R. melina* Greene, *R. nutkana* Presl, *R. pisocarpa* Gray, *R. sayi* Schwein., *R. spaldingii* Crep., *R. spithamea* Wats., and *R. woodsii* Lindl.

Stomach records (summary): Thirty-eight species of birds, including ruffed grouse, bobwhite, sharp-tailed grouse, and prairie chicken; composed 1.7 percent of fall food of prairie chicken in Wisconsin; composed 5.6 percent of fall food of sharp-tailed grouse in Wisconsin; composed 3.0 percent of winter food of northern sharp-tailed grouse in Quebec and Ontario; composed 1.5 percent of winter food of ruffed grouse in the northeastern United States; mountain sheep, pale chipmunk, black-tailed deer; plains white-tailed deer, opossum, white-tailed deer, coyote. *Observations* (summary): Sixteen species of birds; of considerable importance as food for greater prairie chicken, sharp-tailed grouse and ring-necked pheasant; a greatly preferred food of wild turkey; furnishes grit for prairie sharp-tailed grouse, northern sharp-tailed grouse, pinnated grouse, and ruffed grouse; Merriam's turkey; red squirrel, pale chipmunk, mule deer, porcupine; relished by Olympic wapiti. Rocky Mountain mule deer, Columbian black-tailed deer, Rocky Mountain snowshoe rabbit, New Mexico black bear, moose, snowshoe hare, cottontail rabbit, pica.

In view of the involved synonomy of the species it is quite certain that identifications and reports of utilization by wildlife are probably very often in error, and that some of the species names listed above may be misunderstood by users of this list. Perhaps the safest statement to make would be that since most of the roses hold their fruit the year round and have been fairly well demonstrated to act either as a reserve food or grit or both, that utilization of the wild roses in planting for wildlife may often be of value.

Rubus spp. **Blackberries, dewberries.**

Because of the difficulty of identifying species of *Rubus*, which are in the same general taxonomic confusion as *Crataegus*, they are treated only as a genus.

The erosion-control value of the blackberries or dewberries lies in the fact that many species form dense thickets comparatively rapidly, and that many form dense mats on the ground. The branches of most species are either prostrate or with the tips bent down, and wherever they touch the ground they take root. Most species will grow satisfactorily in very barren and infertile soils and most of them require sunlight for their best growth and for fruit production. Many are considered troublesome weeds in fields. The greater number ordinarily invade and rapidly occupy burns, eroded areas, old fields, and logged areas. Many produce biennial canes which fruit and perish.

Numerous species harbor rusts which also attack cultivated blackberries and raspberries. They are subject as well to anthracnose leaf spot, mosaic, and double blossom, all diseases which affect cultivated species of *Rubus*. For this reason considerable care needs to be exercised in planting them. Among those most free of disease should be listed the Himalaya blackberry (*R. procerus* Muell., *R. thyrsanthus* of Am. Auths.) which is susceptible to orange rust, but fairly free from other diseases and safe to plant. The second species is the evergreen blackberry (*R. laciniatus* Willd.) (Pl. 36, B) which, outside of the Northwest, is generally subject to double blossom but otherwise is comparatively free from disease. Both of these introduced species are more or less naturalized in various parts of the country.

Mowing brambles usually results in an increase in the number of shoots and enhanced vigor of growth. If this is practiced two to three time a season for 2 years or longer, eradication may be accomplished. Burning generally favors brambles unless additional brush is piled on them to make a hotter fire.

Stomach records (summary): One hundred and forty-six species of birds, including bobwhite, ruffed grouse, dusky grouse, sharp-tailed grouse, Richardson's grouse, California quail, ring-necked pheasant, and greater prairie chicken; composed 3.1 percent of fall food of prairie chicken in Wisconsin; composed 8.1 percent of fall food of sharp-tailed grouse in Wisconsin; mountain sheep, coyote, opossum, Townsend's chipmunk, chipmunk, dusky marmot, Florida skunk, black-tailed deer, red fox, gray fox, plains white-tailed deer, white-tailed deer; composed 10.8 percent of fruit food of the eastern skunk in Michigan.

Observations (summary): Sixty-three species of birds; ranks eighteenth on the list of quail food plants of the Southeast; an important food of ring-necked pheasants; blue grouse, ruffed grouse, Hungarian partridge, relished by scaled quail, band-tailed pigeon; form a prominent share of midsummer food of skunks in New York; of considerable importance as food and cover for rabbits; pica, red squirrel, black bear, beaver; second most preferred winter food of deer in Massachusetts (especially *R. hispidus*); *R. parviflorus* is of outstanding importance as browse for mule deer, *R. leucodermis* of slight importance; red fox, captive marsh rabbit, porcupine; relished by Olympic wapiti; an important food of Roosevelt elk; Columbian black-tailed deer, Rocky Mountain mule deer, ring-tailed cat, Townsend's chipmunk, Allen's chipmunk, golden-mantled ground squirrel, brown mountain beaver, Pacific mountain beaver, Olympic black bear, snowshoe hare; squirrels, moose.

Of some small value as forage for livestock; as a whole the group is of secondary palatability to livestock.

Rufacer rubrum, see *Acer rubrum*.

Rulac californicum, see *Acer negundo*.

Rulac interior, see *Acer negundo.*

Rulac negundo, see *Acer negundo.*

Rulac nuttalii, see *Acer negundo.*

Rulac texana, see *Acer negundo.*

Ryncholeucaena greggii, see *Leucaena greggii.*

Sabal spp.
Stomach records (in addition to specific records): Two species of birds.

Sabal adansonii, see *Sabal louisiana,* and *S. minor.*

Sabal caroliniana, see *Sabal minor.*

Sabal deeringiana, see *Sabal louisiana.*

Sabal glabra, see *Sabal minor.*

Sabal hystrix, see *Rhapidophyllum hystrix.*

Sabal louisiana (Darby) Bomhard. **Delta palmetto.**
S. adansonii Raf., not Guers., *S. deeringiana* Small, *Chamaerops louisiana* Darby.
Range: 30.
Site: Well-drained, sun.
Fruit: Drupe.
A small to large evergreen tree.

Sabal mexicana, see *Sabal texana.*

Sabal minima, see *Sabal minor.*

Sabal minor (Jacq.) Pers. **Dwarf palmetto.**
S. adansonii Guers., not Raf., *S. caroliniana* Schult., *S. glabra* (Mill.) Sarg., *S. minima* (Nutt.) Wendl., *S. nitida* Hart., *S. pumila* (Walt.) Ell., *S. taurina* Lodd., *Brahea minima* (Nutt.) Wendl., *Chamaerops glabra* Mill., *C. acaulis* Michx., *Corypha minor* Jacq., *C. pumila* Walt., *Raphis acaulis* Walt.
Range: 20, 29, 30.
Site: Well-drained, moist.
Fruit: Drupe, persistent.
A large evergreen shrub; stems subterranean; often considered a troublesome plant in cultivated fields. Much browsed by cattle.

Sabal nitida, see *Sabal minor.*

Sabal palmetto (Walt.) Lodd. **Cabbage palmetto.**
S. schwarzii (Cook) Becc., *Corypha palmetto* Walt.
Range: 30.
Site: Dry, well-drained, sun, moist.
Fruit: Drupe, available October–November.
A large evergreen tree.
Stomach records: Four species of birds. *Observations:* Five species of birds including bobwhite.

Sabal pumila, see *Sabal minor.*

Sabal schwarzii, see *Sabal palmetto.*

Sabal taurina, see *Sabal minor.*

Sabal texana (Cook) Becc. **Texas palm.**
S. mexicana Wats., not Mart., *Inodes texana* Cook.
Range: 11, 17.
Site: Well-drained, sun.
Fruit: Drupe.
A large evergreen tree; commonly occurs in sand; grows readily from seed; slow growing; difficult to transplant.

Sabina barbadensis, see *Juniperus lucayana.*

Sabina flaccida, see *Juniperus flaccida.*

Sabina monosperma, see *Juniperus monosperma.*

Sabina occidentalis, see *Juniperus occidentalis.*

Sabina pachyphloea, see *Juniperus pachyphloea.*

Sabina pinchotii, see *Juniperus pinchotii.*

Sabina sabinoides, see *Juniperus mexicana.*

Sabina scopulorum, see *Juniperus scopulorum.*

Sabina utahensis, see *Juniperus utahensis.*

Sabina virginiana, see *Juniperus virginiana.*

Saccharodendron barbatum, see *Acer saccharum.*

Saccharodendron floridanum, see *Acer floridanum.*

Saccharodendron leucoderme, see *Acer leucoderme.*

Saccharodendron nigrum, see *Acer nigrum.*

Sageretia minutiflora (Michx.) Trel. **Buckthorn.**
Range: 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe.

A small or large, trailing or straggling shrub, or occasionally a vine; spinescent; flowers April–May; commonly occurs on calcareous soil.

Sageretia wrightii Wats.
Range: 10, 11.
Site: Dry, sun.
Fruit: Drupe.

A small to large, spiny shrub. Without forage value for livestock as far as known.

Salazaria mexicana Torr. **Bladder-sage.**
Range: 9, 10.
Site: Dry, sun.
Fruit: Nutlet.

A small or rarely a large shrub; intricately branched and spinescent.

Salix spp. **Willows.**

The willows are generally rapid growing; tolerant of moisture; adaptable to a great variety of soils and situations; gregarious because of the ease with which they grow from suckers and their vitality and free formation of shoots and seeds; most willows commonly produce root shoots and shoot roots; generally intolerant of shade and hence usually replaced by other trees in forests; relatively short-lived; seed vitality transient; often much wind-damaged; many of the species are very difficult of separation.

Attention should be called to the willow scab. This disease, caused by the attacks of two fungi (*Fusicladium saliciperdium* and *Physalospora miyabeana*), occurs through most of New England and in New York and Pennsylvania. It has recently been found in the mountains of North Carolina. Willows of the *Salix alba*, *S. nigra*, and *S. cordata* types seem most susceptible. In the susceptible region at least, willows used for extensive planting should be grown from cuttings taken from resistant trees.

Stomach records (in addition to specific records): Twenty-three species of birds, including ptarmigan, ruffed grouse, dusky grouse, California quail, sharp-tailed grouse, and Richardson's grouse; composed 3.9 percent of winter food of northern sharp-tailed grouse in Ontario and Quebec; mountain sheep, moose, northern white-tailed deer, brush rabbit, grizzly, plains white-tailed deer, black-tailed deer. *Observations* (in addition to specific records): Thirteen species of birds, mostly upland game birds, as ptarmigan, ruffed grouse, Gambel quail, sharp-tailed grouse; willow, rock and white-tailed ptarmigan; staple winter food of prairie sharp-tailed grouse in Wisconsin; emergency food of greater prairie chicken in Wisconsin and Iowa; somewhat eaten by muskrats in times of scarcity; much eaten by beaver; much eaten in the spring by rock squirrels in the Southeast; principal food of golden beaver; important food of snowshoe rabbits in northern Minnesota; Olympic wapiti; important food of moose; porcupine, Columbian black-tailed deer; important food of Pacific coast beaver, Shasta beaver and brown mountain beaver; Rocky Mountain snowshoe rabbit, broad-tailed beaver, Rio Grande beaver, bighorn.

The majority of species have value as browse for livestock.

Salix adenophylla Hook.
S. syrticola Fern.
Range: 23, 24, 26.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large, straggling shrub.

Salix alba L. **European white willow.**
Range: 9, 15, 16, 19, 22, 25, 27, 28, 29.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large tree introduced from Europe and more or less naturalized in the regions indicated.

Salix ambigua, see *Salix longipes.*

Salix amygdaloides Anders. **Peachleaf willow.**
Range: 4, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27.
Site: Moist, sun.
Fruit: Capsule.
A large shrub to small or large tree; dioecious; rapid growing; short-lived.

Salix argophylla Nutt. **Silverleaf willow.**
S. macrostachya Nutt.
Range: 4, 6, 7, 8, 9, 12, 13, 14.
Site: Moist, sun.
Fruit: Capsule.
A large shrub to small tree.
Observations: Of slight importance as browse for mule deer. Of value as browse for cattle and sheep.

Salix argyrocarpa Anders.
Range: 26, 27.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A small shrub.

Salix austinae, see *Salix lemmonii.*

Salix bakeri, see *Salix lasiolepis.*

Salix balsamifera (Hook.) Barr. **Balsam willow.**
S. pyrifolia Anders.
Range: 23, 24, 26.
Site: Moist, sun.
Fruit: Capsule.
A large shrub or rarely a small tree.

Salix barclayi Anders. **Barclay willow.**
S. conjuncta Bebb.
Range: 4, 12, 13.
Site: Well-drained, sun.
Fruit: Capsule.
A small to large, thicket-forming shrub.
Stomach records: Mountatin sheep. An especially good browse for sheep.

Salix bebbiana Sarg. **Bebb willow.**
S. perrostrata Rydb., *S. rostrata* Rich.
Range: 6, 7, 8, 9, 11, 12, 13, 14, 15, 18, 19, 21, 22, 23, 24, 26, 27.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small or large tree; does not form suckers.
Observations: Cottontail rabbit. Relished by livestock in the West.

Salix bella Piper.
Range: 7, 12.
Site: Well-drained, sun.
Fruit: Capsule.
A large shrub.

Salix bigelovii, see *Salix lasiolepis.*

Salix boiseana, see *Salix lasiolepis.*

Salix bolanderiana, see *Salix melanopsis.*

Salix bonplandiana H. B. K.
S. pallida H. B. K., *S. bonplandiana toumeyi* Schneid.
Range: 10, 11.
Site: Well-drained, sun.
Fruit: Capsule.
A large tree. Eaten by livestock when young.

Salix brachycarpa Nutt.
S. stricta (Anders.) Rydb.
Range: 4, 12, 13.
Site: Moist, sun.
Fruit: Capsule.
A small shrub.

Salix brachystachys, see *Salix scouleriana.*

Salix breweri Bebb. Brewer willow.
Range: 4.
Site: Moist, sun.
Fruit: Capsule.
A small, spreading shrub.

Salix caespitosa, see *Salix petrophila.*

Salix californica, see *Salix eastwoodiae.*

Salix candida Fluegge. Sage willow.
Range: 12, 13, 15, 18, 21, 22, 23, 24, 26, 27.
Site: Moist, sun.
Fruit: Capsule.
A small shrub.

Salix capreoides, see *Salix scouleriana.*

Salix cascadensis Cockerell.
S. tenera Anders.
Range: 4, 12, 13, 14.
Site: Well-drained, sun.
Fruit: Capsule.
A small, prostrate shrub.
Stomach records: Mountain sheep. *Observations:* Of slight importance as browse for mule deer. Eaten by sheep.

Salix caudata (Nutt.) Heller. Caudate willow.
S. lasiandra caudata (Nutt.) Sudw.
Range: 4, 6, 8, 11, 12, 13, 14, 15 (Black Hills).
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub.

Salix chapmanii, see *Salix longipes.*

Salix chlorophylla, see *Salix planifolia.*

Salix coactilis Fern.
Range: 26.
Site: Well-drained, sun.
Fruit: Capsule.
A large shrub.

Salix columbiae, see *Salix pseudomyrsinites.*

Salix commutata Bebb.
Range: 4, 12.
Site: Moist, sun.
Fruit: Capsule.
A small to large shrub.
Observations: Of slight importance as browse for mule deer. An important browse for livestock.

Salix conjuncta, see *Salix barclayi.*

Salix cordata Muhl. **Heartleaf willow.**
Range: 18, 21, 22, 23, 24, 25, 26, 27, 28.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub to large tree.

Salix coulteri Anders.
Range: 1, 2.
Site: Well-drained, sun.
Fruit: Capsule.
A large shrub.

Salix covillei, see *Salix subcoerulea.*

Salix cuneata, see *Salix sitchensis.*

Salix discolor Muhl. **Pussy willow.**
S. eriocephala Michx., *S. prinoides* Pursh.
Range: 15, 18, 21, 22, 24, 25, 26, 27, 28.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small tree.
Observations: Cottontail rabbit.

Salix dodgeana Rydb.
Range: 12.
Site: Well-drained, sun.
Fruit: Capsule.
A prostrate, tiny shrub of mountain peaks.

Salix eastwoodiae Cockerell.
S. californica Bebb, not Lesq.
Range: 4, 12.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A small shrub.

Salix eriocephala, see *Salix discolor.*

Salix exigua Nutt. **Sandbar willow.**
S. fluviatilis exigua (Nutt.) Sarg., *S. lutosericea* Rydb., *S. nevadensis* Wats., *S. stenophylla* Rydb.
Range: 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small tree; commonly occurs in sand and other soils.
Observations: Of slight importance as browse for mule deer. Relished by livestock.

Salix farrae Ball. **Farr willow.**
Range: 12.
Site: Well-drained, sun.
Fruit: Capsule.
A small, alpine shrub.

Salix fendleriana, see *Salix lasiandra.*

Salix fernaldii, see *Salix vestita.*

Salix flava, see *Salix lutea.*

Salix flavescens, see *Salix scouleriana.*

Salix fluviatilis, see also *Salix interior.*

Salix fluviatilis Nutt. **River willow.**
S. longifolia of auths, not Muhl., *S. sessifolia* of auths., not Nutt.
Range: 1, 2, 6.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small tree.

Salix fragilis L. **Crack willow.**
Range: 21, 22, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.

A small to large tree; twigs very brittle at base (abcission layer), easily breaking off and rooting.

Observations: Cottontail rabbit.

Salix franciscana, see *Salix lasiolepis.*

Salix geyeriana Anders. **Geyer willow.**
S. macrocarpa Nutt.
Range: 2, 4, 12, 13, 14, 15.
Site: Well-drained, sun.
Fruit: Capsule.

A small to large shrub. Relished by livestock.

Salix glaucophylla Bebb.
Range: 22, 23, 24, 26.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small to large shrub; forms extensive thickets; occurs in sand.

Salix glaucops Anders.
S. glauca glabrescens of auths., *S. nudescens* Rydb., *S. pseudolapponum* v. Seem., *S. seemanii* Rydb., *S. wyomingensis* Rydb.
Range: 4, 12, 13, 14, 15 (Black Hills).
Site: Well-drained, sun.
Fruit: Capsule.

A small shrub. An especially important stock-browse plant of the highest summer ranges.

Salix gooddingii Ball.
S. nigra of Jeps., not Marsh., *S. vallicola* (Dudl.) Britt.
Range: 3, 4, 5, 9, 10, 11, 14.
Site: Well-drained, sun.
Fruit: Capsule.

A small shrub to large tree; apparently not tolerant of alkaline conditions; commonly occurs in patches or clumps.

Observations Of fair importance as browse for mule deer.

Salix gracilis, see *Salix petiolaris.*

Salix harbisonii Schneid. **Harbison willow.**
Range: 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small to large tree.

Salix herbacea L.
Range: 26.
Site: Well-drained, sun.
Fruit: Capsule.

A creeping plant of mountain peaks.

Salix hindsiana Benth. **Valley willow.**
S. parishiana Rowl., *S. sessilifolia* of Calif. auths.
Range: 1, 3, 4, 5, 10.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large shrub to large tree.

Salix hookeriana Barr. **Coast willow.**
Range: 1.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.

A large, bushy shrub to small or large tree; may occur on or near salt marshes; commonly occurs in sand, gravel, or muck; may be buried by sand although often continuing to grow.

Salix humilis Marsh. **Prairie willow.**
Range: 15, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.

A small to large shrub; thicket forming.

Salix interior Rowl. **Sandbar willow.**
S. fluviatilis of auths., not Nutt., in part, *S. linearifolia* Rydb., in part, *S. longifolia* Muhl., *S. thurberi* Rowl., *S. wheeleri* (Rowl.) Rydb.
Range: 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Capsule, available in April.

A large shrub to small or rarely a large tree; forms thickets by stolons.

Observations: White-tailed deer.

Salix irrorata Anders. **Bluestem willow.**
Range: 11, 13, 14.
Site: Well-drained, sun.
Fruit: Capsule.

Commonly a small shrub, more rarely a large shrub to small tree.

Salix laevigata Bebb. **Red willow.**
Range: 1, 3, 4, 5, 9, 10, 11.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large shrub to large tree; rapid growing when young; short lived; commonly occurs in sandy or gravelly soil.

Observations: Of fair importance as browse for mule deer.

Salix lancifolia, see *Salix lasiandra.*

Salix lasiandra Benth.
S. fendleriana Anders., *S. lancifolia* Anders., *S. lyallii* (Sarg.) Heller.
Range: 1, 2, 3, 4, 5, 11, 13, 14.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large shrub to small or large tree; commonly occurs in sandy and other soils.

Observations: Of fair importance as browse for mule deer.

Salix lasiolepis Benth. **Arroyo willow.**
S. bakeri v. Seem., *S. boiseana* Nels., *S. sandbergii* Rydb.
Range: 1, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.

A large shrub to small or large tree.

Var. *bigelovii* (Torr.) Bebb, (*S. bigelovii* Torr., *S. franciscana* v. Seem.) occurs in the central northern portions of the range. The form described as *S. sandbergii* is perhaps better considered a variety of the species. It occurs in regions 8 and 12, and is able to grow in dry sites.

Observations: Of fair importance as browse for mule deer.

Salix lemmonii Bebb. **Lemmon's willow.**
S. austinae Bebb.
Range: 4, 10.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small to large shrub.

Observations: Of slight importance as browse for mule deer.

Salix ligulifolia Ball.
Range: 4, 13, 14.
Site: Moist, sun.
Fruit: Capsule.

A small or large shrub to small tree.

Salix linearifolia, see *Salix interior.*

Salix longifolia, see *Salix fluviatilis, S. interior*, and *S. melanopsis.*

Salix longipes Shuttlew.
S. ambigua Small, *S. chapmanii* Small, *S. occidentalis* Koch, *S. wardii* Bebb.
Range: 19, 20, 22, 25, 27, 28, 29, 30, 31, 32.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A small to large tree.
Observations: Captive marsh rabbit.

Salix lucida Muhl. **Shining willow.**
Range: 18, 21, 22, 23, 24, 25, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small or rarely a large tree.
Observations: Cottontail rabbit.

Salix lutea Nutt. **Yellow willow.**
S. flava Rydb., *S. watsonii* (Bebb) Rydb.
Range: 4, 6, 8, 9, 10, 12, 13, 14, 15, 18.
Site: Moist, sun.
Fruit: Capsule.
A small or large shrub to small tree, universally browsed by livestock.

Salix lutosericea, see *Salix exigua.*

Salix lyallii, see *Salix lasiandra.*

Salix mackenziana (Hook.) Barr. **Mackenzie willow.**
S. cordata mackenziana Hook.
Range: 1, 2, 4, 6, 7, 8, 12, 13.
Site: Moist, sun.
Fruit: Capsule.
A large shrub to small or rarely a large tree; occurs in rocky and gravelly soil.

Salix macrocarpa, see *Salix geyeriana.*

Salix macrostachya, see *Salix argophylla.*

Salix marginata, see *Salix nigra.*

Salix melanopsis Nutt. **Dusky willow.**
Range: 3, 4, 5, 7, 8, 9, 10, 12, 13.
Site: Moist, sun.
Fruit: Capsule.
A large shrub to small or large tree.
Var. *bolanderiana* (Rowl.) Schneid. (*S. bolanderiana* Rowl., *S. longifolia* Jeps.) occurs within the range of the species.
Observations: Of slight importance as browse for mule deer.

Salix microphylla, see *Salix taxifolia.*

Salix missouriensis Bebb.
Range: 15, 18, 21, 22, 25.
Site: Well-drained, sun.
Fruit: Capsule.
A large shrub to small tree.

Salix monochroma Ball.
S. pyrifolia Anders., as used by Ball.
Range: 6, 8, 12.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A small to large shrub; relished by livestock, especially in the fall.

Salix monticola Bebb.
S. padophylla Rydb.
Range: 9, 12, 13, 14.
Site: Moist, sun.
Fruit: Capsule.
A small to large shrub.

Salix myrtilloides, see *Salix pedicellaris.*

Salix nelsonii, see *Salix planifolia.*

Salix nevadensis, see *Salix exigua.*

Salix nigra, see also *Salix gooddingii.*

Salix nigra Marsh. **Black willow.**
S. marginata Wimm.
Range: 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule, available April–June.

A large shrub to small or large tree; root system spreading; rapid growing, especially when young; short-lived; much injured by fire, wind, and fungi; seed germination percentage high, vitality transient; wood used to some extent commercially.

Observations: White-tailed deer, cottontail rabbit.

Salix nivalis Hook.
Range: 4, 12, 13, 14.
Site: Well-drained, sun.
Fruit: Capsule.

A small, prostrate shrub.

Salix nudescens, see *Salix glaucops.*

Salix nuttallii, see *Salix scouleriana.*

Salix occidentalis, see *Salix longipes.*

Salix orestera Schneid. **Sierra willow.**
S. glauca orestera Jeps., *S. glauca villosa* Bebb (Jeps. et al.).
Range: 4.
Site: Moist, sun.
Fruit: Capsule.

A small to large, spreading shrub.

Salix pachnophora, see *Salix subcoerulea.*

Salix padophylla, see *Salix monticola.*

Salix pallida, see *Salix bonplandiana.*

Salix parishiana, see *Salix hindsiana.*

Salix parksiana Ball.
Range: 1.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small to large shrub.

Salix pedicellaris Pursh. **Bog willow.**
S. myrtilloides of auths., not L.
Range: 26, 27.
Site: Moist, sun.
Fruit: Capsule.

A small shrub. Var. *hypoglauca* Fern., is in regions 1, 2, 4, 12, 21, 23, and 24.

Salix pellita Anders.
Range: 26, 27.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A large shrub to small tree.

Salix pennata Ball.
Range: 4, 12.
Site: Well-drained, sun.
Fruit: Capsule, available in August.

A small, spreading shrub.

Salix perrostrata, see *Salix bebbiana.*

Salix petiolaris Smith.
S. gracilis Anders.
Range: 13, 15 (Black Hills), 18, 21, 22, 23, 24, 25, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Capsule.

A small to large shrub.

Salix petrophila Rydb.
S. caespitosa Kenn.
Range: 4, 12, 13, 14.
Site: Well-drained, sun.
Fruit: Capsule.
A small shrub with creeping stems; occurs on alpine summits.

Salix phylicifolia, see *Salix planifolia.*

Salix piperi Bebb. **Piper willow.**
Range: 1, 2.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small tree, commonly occurs in sand.

Salix planifolia Pursh.
S. chlorophylla Anders., *S. monica* Bebb, *S. nelsonii* Ball, *S. phylicifolia* of Amer. auths., not L.
Range: 4, 12, 13, 14, 15 (Black Hills), 23, 26, 27.
Site: Well-drained, sun.
Fruit: Capsule.
A small to large shrub.
Observations: Of slight importance as browse for mule deer.

Salix prinoides, see *Salix discolor.*

Salix pseudolapponum, see *Salix glaucops.*

Salix pseudomonticola Ball.
Range: 4, 12, 15 (Black Hills).
Site: Well-drained, sun.
Fruit: Capsule.
A small to large shrub.

Salix pseudomyrsinites Anders.

Salix columbiae Mac Br and Nels.
Range: 4, 8, 9, 12, 13, 14.
Site: Well-drained, sun.
Fruit: Capsule.
A small to large shrub.

Salix purpurea L. **Basket willow.**
Range: 22, 25, 27, 28, 29.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small tree.

Salix pyrifolia, see *Salix balsamifera,* and *S. monochroma.*

Salix rostrata, see *Salix bibbiana.*

Salix sandbergii, see *Salix lasiolepis.*

Salix saximontana Rydb.
Range: 12, 13, 14.
Site: Moist, sun.
Fruit: Capsule.
A prostrate shrub; branches occasionally rooting.

Salix scouleriana Barr. **Fire willow.**
S. brachystachys Nutt., *S. capreoides* Anders., *S. flavescens* Nutt., *S. nuttallii* Sarg., *S. scouleriana crassijulis* Anders.
Range: 2, 3, 4, 6, 7, 8, 9, 10, 12, 13, 14, 15.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small or large tree; rapid growing; easily recovers from grazing; thicket forming; a pioneer in burned-over areas.
Observations: Of fair importance as browse for mule deer. One of the best species of native western range willows as browse for livestock.

Salix seemanii, see *Salix glaucops.*

Salix sericea Marsh. **Silky willow.**
Range: 21, 22, 23, 24, 25, 26, 27, 28.
Site: Moist, well-drained, sun.
Fruit: Capsule.
A large shrub.
Observations: Cottontail rabbit.

Salix serissima (Bail.) Fern. **Autumn willow.**
S. pallescens hirtisquama Anders.
Range: 12, 13, 15, 18, 21, 23, 24, 26, 27.
Site: Moist, sun.
Fruit: Capsule.
A large shrub; commonly occurs on calcareous soil.

Salix sessilifolia, see also *Salix fluviatilis* and *S. hindsiana.*

Salix sessilifolia Nutt. **Sandbar willow.**
Range: 1, 2, 4.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small tree, of some importance as a honey plant in California.

Salix sitchensis Sans. **Silky willow.**
S. cuneata Nutt.
Range: 1, 2, 4, 7, 12.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small or large tree.

Salix stenophylla, see *Salix exigua.*

Salix stricta, see *Salix brachycarpa.*

Salix subcoerulea Piper. **Blue willow.**
S. covillei Eastw., *S. pachnophora* Rydb.
Range: 4, 12, 13, 14.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A small to large shrub; relished by livestock.

Salix syrticola, see *Salix adenophylla.*

Salix taxifolia H. B. K. **Yewleaf willow.**
S. microphylla Schlecht. and Cham.
Range: 9, 11.
Site: Well-drained, sun.
Fruit: Capsule.
A large shrub to large tree.

Salix tenera, see *Salix cascadensis.*

Salix thurberi, see *Salix interior.*

Salix tracyi Ball.
Range: 1, 4.
Site: Well-drained, moist, sun.
Fruit: Capsule.
A large shrub to small tree.

Salix tristis Ait. **Dwarf gray willow.**
Range: 21, 22, 23, 24, 25, 27, 28, 29.
Site: Dry, well-drained, sun.
Fruit: Capsule.
A small shrub; commonly occurs in sandy soil.

Salix tweedyi (Bebb) Ball.
S. barrattiana tweedyi Bebb.
Range: 12.
Site: Moist, sun.
Fruit: Capsule.
A large shrub.

Salix uva-ursi Pursh. **Bearberry willow.**
Range: 26, 27.
Site: Well-drained, sun.
Fruit: Capsule.

A small, prostrate, mat-forming, alpine shrub, with a central root.

Salix vallicola, see *Salix gooddingii.*

Salix vestita Pursh.
S. fernaldii Blankinship.
Range: 12, 26.
Site: Well-drained, sun.
Fruit: Capsule.

Salix wardii, see *Salix longipes.*

Salix watsonii, see *Salix lutea.*

Salix wheeleri, see *Salix interior.*

Salix wolfii Bebb.
Range: 12, 13.
Site: Well-drained, sun.
Fruit: Capsule.

A small shrub. Var. *idahoensis* Ball, is considered a very good sheep browse in Idaho.

Salix wrightii Anders. **Wright willow.**
S. amygdaloides wrightii Anders.
Range: 11, 14, 16.
Site: Moist, sun.
Fruit: Capsule.

A large shrub to large tree, eaten by livestock when young.

Salix wyomingensis, see *Salix glaucops.*

Salvia spp. **Sage.**
Stomach records (in addition to specific records): Gambel and scaled quail. These records may apply to herbaceous as well as woody species. In general, the species rival clover and linden as honey plants.

Salvia apiana Jeps. **White sage.**
Audibertia polystachya Benth., *Ramona polystachya* (Benth.) Greene.
Range: 5, 10.
Site: Dry, sun.
Fruit: Nutlet.

A large shrub. An apparent hybrid between this and *P. clevelandii* is called *S. palmeri* (Gray) Greene.

Furnishes some winter browse for livestock. An important honey plant.

Salvia ballotaeflora Benth. **Shrubby blue sage.**
Range: 11, 16, 17, 20.
Site: Dry, sun.
Fruit: Capsule.

A small shrub; flowers throughout the summer; drops its leaves in times of drought, regains them with rain.

Salvia carnosa Dougl. **Desert sage.**
Audibertia incana Benth., *Audibertiella incana* Briq., *Ramona incana* (Benth.) Dougl.
Range: 4, 7, 8, 9, 10.
Site: Dry, well-drained, sun.
Fruit: Nutlet.

A small, compact, much-branched shrub; flowers May–June; a variety which is woody at the base only occurs in region 5. Generally of low palatability but somewhat useful as browse for livestock.

Salvia clevelandii Gray.
Range: 5.
Site: Dry, sun.
Fruit: Nutlet.

A small shrub; flowers May–August.

Salvia confinis Fern.
Range: 10, 11.
Site: Dry, well-drained, sun.
Fruit: Nutlet.
A small shrub.

Salvia eremostachya Jeps.
Range: 10.
Site: Dry, sun.
Fruit: Nutlet.
A small shrub.

Salvia funerea Jones.
Range: 10.
Site: Dry, sun.
Fruit: Nutlet.
A small, densely branched, compact, densely leafy shrub; flowers April–May.

Salvia greatae Brandeg.
Range: 10.
Site: Dry, sun.
Fruit: Nutlet.
A small shrub; flowers in April.

Salvia greggii Gray. **Autumn sage.**
Range: 11, 17.
Site: Dry, sun.
Fruit: Nutlet.
A small shrub; flowers throughout the summer.

Salvia mellifera Greene. **Black sage.**
Audibertia stachyoides Benth., *Ramona stachyoides* (Benth.) Briq.
Range: 5, 10.
Site: Dry, sun.
Fruit: Nutlet.
A small to large, openly branched shrub; flowers April–May; inflammable; somewhat loosely branched.

More or less browsed by sheep and goats. Has been said to be the best honey plant of the Pacific coast.

Salvia mohavensis Greene.
Audibertia capitata Gray.
Range: 10.
Site: Dry, sun.
Fruit: Nutlet.
A small, much-branched, compact shrub; flowers May—June.

Salvia pachyphylla Epling.
Audibertia pachystachya Gray.
Range: 10.
Site: Dry, sun.
Fruit: Nutlet.
A small shrub.

Salvia palmeri, see *Salvia apiana.*

Salvia pinguifolia (Fern.) Woot, and Standl.
Range: 11.
Site: Dry, sun.
Fruit: Nutlet.
A small shrub.

Salvia vaseyi (Porter) Parish.
S. vaseyi (Porter) Jeps.
Range: 10.
Site: Dry, sun.
Fruit: Nutlet.
A small shrub.

Samanea flexicaulis, see *Pithecolobium flexicaule.*

Sambucus spp. **Elders.**

The blue- or black-fruited species are edible at least when cooked; some red berries have poisoned human beings; most species grow on slightly acid soil.

Stomach records (in addition to specific records): One hundred and eleven species of birds, including ruffed grouse, dusky grouse, California quail, and Gambel quail; opossum. *Observations* (in addition to specific records): Thirty-four species of birds, including band-tailed pigeon, porcupine, Olympic black bear.

Sambucus caerulea Raf. (pl. 37, *B*). **Blueberry elder.**

S. glauca Nutt., *S. neomexicana* Woot.

Range: 1, 2, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14.
Site: Dry, well-drained, moist, sun.
Fruit: Berry; available August–October, or rarely to December.

Usually a large shrub, more rarely a small to large tree; flowers April–July; not gregarious; coppices freely, the sprouts growing as much as 15 feet in a single year; berries produced abundantly; wood durable in contact with the soil.

Var. *velutina* (Dur.) Schwer., (*S. velutina* Dur.), the velvet-leaf elder, occurs in regions 4, 5, and 10. It has a limited value as browse for livestock and is of outstanding importance as browse for mule deer. A form of the species occurring in region 14 has been described as *S. vestita* Woot. and Standl.

Stomach records: Nine species of birds, including ruffed grouse, California quail, valley quail, and Gambel quail. *Observations:* Ring-necked pheasant; much eaten by birds generally; Rocky Mountain mule deer; California mule deer. Worthless to poor forage for sheep; worthless for cattle in the spring and summer, but in the fall good to excellent.

Sambucus callicarpa Greene. **Redberry elder.**

Range: 1, 2, 4.
Site: Dry, well-drained, moist, sun.
Fruit: Berry; available June–September, occasionally persistent until December.

Commonly a large shrub or rarely a small to large tree; flowers April–May; somewhat loosely-branched; coppices freely; sprouts may grow as much as 13 feet in one season; clump forming.

Stomach records: Three species of birds, including sooty grouse. *Observations:* Sooty grouse, band-tailed pigeon. Good sheep and fairly good cattle browse in the fall.

Sambucus canadensis L. (pl. 38). **American elder.**

Range: 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available August–October.

A large stoloniferous shrub; flowers June–July; produces seed 4 years after sowing; the fresh leaves, berries, flowers, and roots yield hydrocyanic acid; cooking breaks up the cyanogenetic glucosides; grows on coal-stripped lands in Illinois: 175,000–468,000 seeds per pound.

Stomach records: Forty-three species of birds, including ruffed grouse, bobwhite, and ring-necked pheasant; composed 0.2 percent of total annual food, and 2.8 percent of fruit food of ring-necked pheasant in Michigan. *Observations:* Sixteen species of birds, including mourning dove, wild turkey; an important food of ring-necked pheasant in Michigan; red squirrel, captive marsh rabbit, white-tailed deer. Highly palatable in the fall to livestock.

Sambucus glauca, see *Sambucus caerulea.*

Sambucus melanocarpa Gray. **Black elder.**

Range: 4, 9, 10, 12, 13, 14.
Site: Moist, sun, shade.
Fruit: Berry, available July–September.

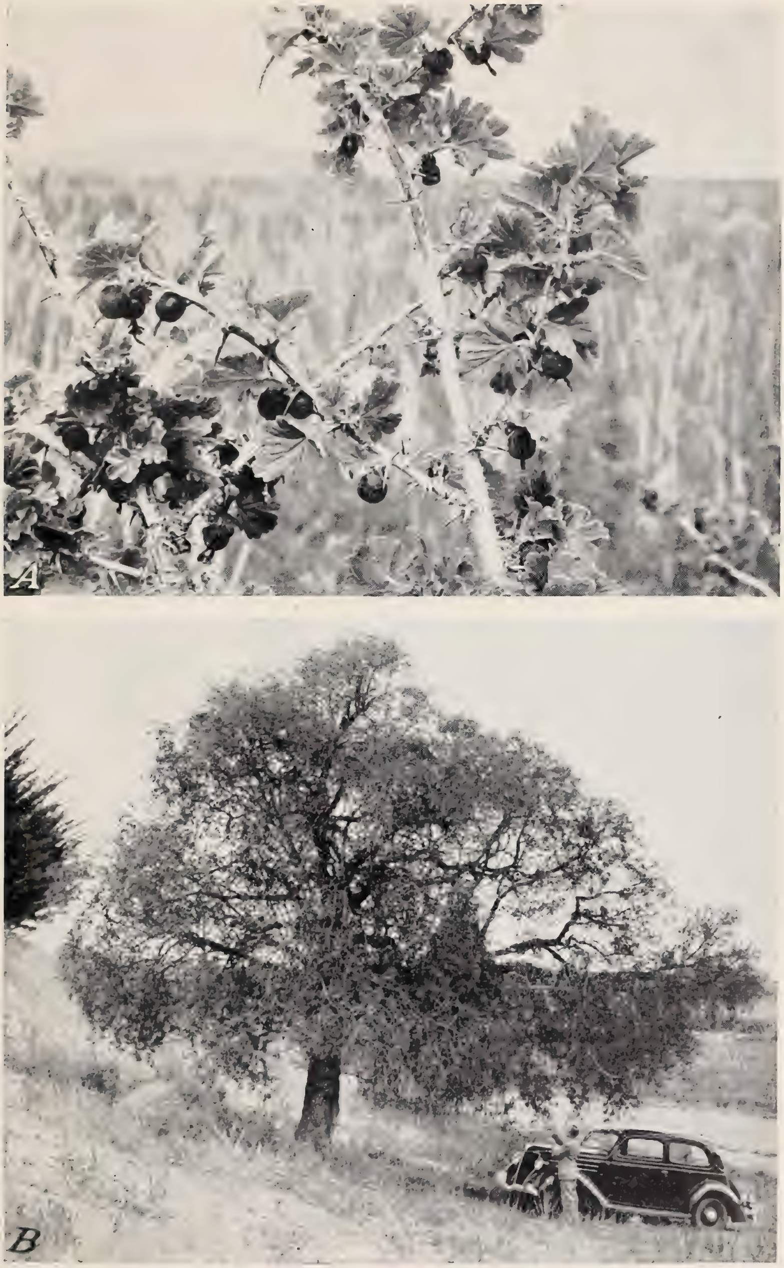
A large shrub with comparatively thick foliage; flowers May–June; may occur on rocky sites. Locally valuable as a fall forage for livestock.

Sambucus mexicana Presl. **Mexican elder.**

S. caerulea arizonica Sarg.

Range: 5, 10, 11, 16, 17.
Site: Moist, sun.
Fruit: Berry, said to be available the year around.

A large shrub to small tree, said to be evergreen; fruit rarely matures in New Mexico.



A, Ribes setosum. A typical wild gooseberry, susceptible to whitepine blister rust, but valuable for soil- and wildlife-conservation plantings in regions where five-needled pines are not grown. *B, Sambucus caerulea.* A very large specimen of an elder that more commonly attains only shrub stature. A noteworthy species for erosion-control and wildlife plantings.

Sambucus canadensis. The berries have been found in the stomachs of 43 kinds of birds. The value of this species in plantings on more moist sites appears high.

Sambucus microbotrys Rydb. **Bunchberry elder.**
Range: 9, 13, 14, 15 (Black Hills).
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available July–September.

A small shrub or rarely a large shrub; flowers May–July.

Stomach records: Richardson's grouse. *Observations:* Dusky grouse. Extensively browsed in summer, even more in the fall, by livestock.

Sambucus neomexicana, see *Sambucus caerulea.*

Sambucus pubens Michx. **Red elder.**
S. racemosa of auths., not L.
Range: 15 (Black Hills), 21, 22, 23, 24, 26, 27, 28.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available June–November, sometimes persistent until January.

A large shrub; flowers April–May; 48,300 seeds per pound. Records of this species on the West Coast probably refer to *S. callicarpa* (q. v.).

Stomach records: Twenty-three species of birds, including ruffed grouse, bobwhite, and ring-necked pheasant. *Observations: Moose*, red squirrel, white-tailed deer.

Sambucus racemosa, see *Sambucus pubens.*

Sambucus simpsonii Rehd. **Southern elder.**
Range: 29, 30, 31.
Site: Well-drained, moist, sun.
Fruit: Berry.

A large shrub to small tree; flowers throughout the year; forms vast thickets.

Sambucus velutina, see *Sambucus caerulea.*

Sambucus vestita, see *Sambucus caerulea.*

Sanviniona assurgentiflora, see *Lavatera assurgentifolia.*

Sapindus drummondii Hook, and Arn. **Western soapberry.**
Range: 11, 16, 17, 19, 20, 22, 25, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Berry; available September–October, commonly persistent until spring.

A large shrub or small to large tree with dense foliage; flowers May–June; occurs on clay, limestone and other soils; wood used to some extent commercially; 1,500–1,700 seeds per pound; contains large quantities of saponin, a severe poison which is objectionable to the taste. Not browsed by livestock.

Sapindus manatensis, see *Sapindus marginatus.*

Sapindus marginatus Willd. **Florida soapberry.**
S. manatensis Radek.
Range: 29, 30.
Site: Well-drained, moist, sun.
Fruit: Berry; available in October.

A small to large tree; flowers in May; commonly occurs in sand.

Sapium biloculare (Wats.) Pax.
S. bilocularis amplum Johnst., *Sebastiania bilocularis* Wats.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Capsule.

A large shrub to small tree; a fish poison; produces jumping beans.

Sarcobatus baileyi Cov.
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small shrub.

Sarcobatus vermiculatus (Hook.) Torr. **Greasewood.**
Range: 6, 7, 8, 9, 10, 11, 12, 15.
Site: Dry, sun.
Fruit: Achene.

A small to large, spiny shrub; occurs in alkaline soil, withstanding a hydrogen-ion concentration to pH 8.0.

Observations: Porcupine, jack rabbit, Zuni prairie dog, painted chipmunk; Cary San Luis chipmunk, western chipmunk. A valuable fall and winter browse for livestock provided it is eaten with other forage in ordinary amounts; young stems and fresh leaves in the spring have caused livestock poisoning.

Sassafras albidum (Nutt.) Nees. **Sassafras.**
S. variifolium (Salisb.) Kuntze., *S. sassafras* (L) Karst., *S. officinale* Nees and Eberm., *Laurus albida* Nutt.
Range: 20, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe; available August–October.

Usually a large shrub, less commonly a small to large tree; occurs on many kinds of soils including sand; reproduces extensively by means of root stocks; densely thicket forming; dioecious; coppices freely after cutting; wood very durable, somewhat used commercially; a pioneer species in old fields; often a troublesome weed.

Stomach records: Eighteen species of birds including bobwhite; woodchuck. *Observations:* Ten species of birds; ranks twenty-sixth on the list of quail food plants in the Southeast; marsh rabbit, woodchuck, wild turkey; black bear, white-tailed deer.

Sassafras officinale, see *Sassafras albidum.*

Sassafras sassafras, see *Sassafras albidum.*

Sassafras variifolium, see *Sassafras albidum.*

Savia phyllanthoides, see *Andrachne phyllanthoides.*

Schaefferia cuneifolia Gray. **Desert yaupon.**
Range: 11, 17, 20.
Site: Dry, sun.
Fruit: Dry drupe; available in May.

A small, densely-branched, spinose shrub; slow growing; easily transplanted.

Schinus fagara, see *Xanthoxylum fagara.*

Schizonotus discolor, see *Holodiscus discolor.*

Schmaltzia affinis, see *Rhus trilobata.*

Schmaltzia anisophylla, see *Rhus trilobata.*

Schmaltzia arenaria, see *Rhus aromatica.*

Schmaltzia aromatica, see *Rhus aromatica.*

Schmaltzia ashei, see *Rhus ashei.*

Schmaltzia bakeri, see *Rhus trilobata.*

Schmaltzia cognata, see *Rhus trilobata.*

Schmaltzia copallina, see *Rhus copallina.*

Schmaltzia cruciata, see *Rhus trilobata.*

Schmaltzia emoryi, see *Rhus trilobata.*

Schmaltzia glabra, see *Rhus glabra.*

Schmaltzia glabrata, see *Rhus trilobata.*

Schmaltzia glauca, see *Rhus trilobata.*

Schmaltzia glomerata, see *Rhus trilobata.*

Schmaltzia hirta, see *Rhus typhina.*

Schmaltzia illinoensis, see *Rhus aromatica.*

Schmaltzia lanceolata, see *Rhus copallina.*

Schmaltzia leiocarpa, see *Rhus trilobata.*

Schmaltzia malacophylla, see *Rhus trilobata.*

Schmaltzia michauxii, see *Rhus michauxii.*

Schmaltzia oxyacanthoides, see *Rhus trilobata.*

Schmaltzia pulchella, see *Rhus trilobata.*

Schmaltzia quercifolia, see *Rhus trilobata.*

Schmaltzia ribifolia, see *Rhus trilobata.*

Schmaltzia scaberula, see *Rhus trilobata.*

Schmaltzia simplicifolia, see *Rhus trilobata.*

Schmaltzia straminea, see *Rhus trilobata.*

Schmaltzia subpinnata, see *Rhus trilobata.*

Schmaltzia trilobata, see *Rhus trilobata.*

Schmaltzia virens, see *Rhus virens.*

Sebastiania bilocularis, see *Sapium biloculare.*

Securingea fasciculata, see *Halliophytum hallii.*

Senegalia berlandieri, see *Acacia berlandieri.*

Senegalia emoryana, see *Acacia emoryana.*

Senegalia greggii, see *Acacia greggii.*

Senegalia malacophylla, see *Mimosa malacophylla.*

Senegalia roemeriana, see *Acacia roemeriana.*

Senegalia wrightii, see *Acacia wrightii.*

Sequoia spp.

Two species of trees attaining tremendous size and age, and producing fine timber; wood very resistant to decay. The tallest, most massive, and oldest of United States forest trees; bark very thick; range of both species very restricted; finest specimens often protected; reproduce freely and abundantly. *Observations* (in addition to specific records): Crossbill; much eaten by squirrels.

Sequoia gigantea, see *Sequoia washingtoniana.*

Sequoia sempervirens (Lamb.) Endl. **Redwood.**

Range: 1.
Site: Well-drained, sun.
Fruit: Cone; ripe in September, seeds shed at once, cones persistent a few months.

A very large, evergreen tree; root system deep or shallow; rapid growing when young, later slower; extremely long-lived; forms very dense forests; reproduces commonly by root and stump sprouts which grow faster than seedlings; wood of great importance commercially; 82,000–115,000 seeds per pound. *Observations:* Sierra chickaree.

Sequoia washingtoniana (Winsl.) Sudw. **Bigtree.**

S. gigantea Decne., *S. wellingtoniana* v. Seem.
Range: 4.
Site: Dry, well-drained, sun.
Fruit: Cone; mature at the end of the second summer, seeds shed slowly, cones soon falling.

A very large, evergreen tree; extremely long-lived; at first rapid growing, later slower; resistant to fire, insects, and fungi; wood of great importance commercially; 93,300 seeds per pound, germination 24 percent, vitality persistent. *Observations:* Much eaten by the California pine squirrel.

Sequoia wellingtoniana, see *Sequoia washingtoniana.*

Serenoa repens (Bart.) Small. **Saw palmetto.**

S. serrulata (Michx.) Hook. f., *Corypha repens* Bart.
Range: 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe; available June–November.

A small to large shrub or small tree; evergreen; stems erect, or often creeping and rooting, or subterranean; forms extensive, dense colonies.

Stomach records: Five species of birds, including bobwhite. *Observations:* Captive marsh rabbit; gray squirrel. An important source of honey.

Serenoa serrulata, see *Serenoa repens.*

Sericotheca discolor, see *Holodiscus discolor.*

Sericotheca dumosa, see *Holodiscus dumosus.*

Sericotheca glabrescens, see *Holodiscus discolor.*

Sericotheca microphylla, see *Holodiscus discolor.*

Sericotheca obovata, see *Holodiscus discolor.*

Sericotheca schaffneri, see *Holodiscus schaffneri.*

Serjania brachycarpa Gray.
Range: 17.
Site: Dry, sun.
Fruit: Samara.

A vine.

Serjania incisa Torr.
Range: 17.
Site: Well-drained, sun.
Fruit: Samara.

A vine.

Shepherdia spp.

Stomach records (in addition to specific records): 7 species of birds, including ruffed grouse; buff-bellied chipmunk, black-tailed deer. *Observations* (in addition to specific records): Three species of birds, including prairie chicken; much eaten by pale chipmunk; porcupine, western chipmunk.

Shepherdia argentea Nutt. (pl. 40, *B*). **Silver buffaloberry.**
Lepargyrea argentea (Nutt.) Greene, *Elaeagnus utilis* Nelson.
Range: 4, 9, 11, 12, 13, 15, 16, 18, 19, 21, 22, 23.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available July–August.

A large, somewhat thorny, dioecious shrub; flowers April–May; edible fruit borne in great profusion; difficult to transplant from the wild; staminate plants in winter have dense clusters of rounded flower buds, while the fruit-bearing, pistillate plants have smaller, flattened, fewer, more slender buds; 36,000–43,000 seeds per pound.

Stomach records: Twelve species of birds; pale chipmunk. *Observations:* Western robin, sharp-tailed grouse. Of slight importance as browse for mule deer; porcupine, Wasatch chipmunk. Worthless as browse for livestock.

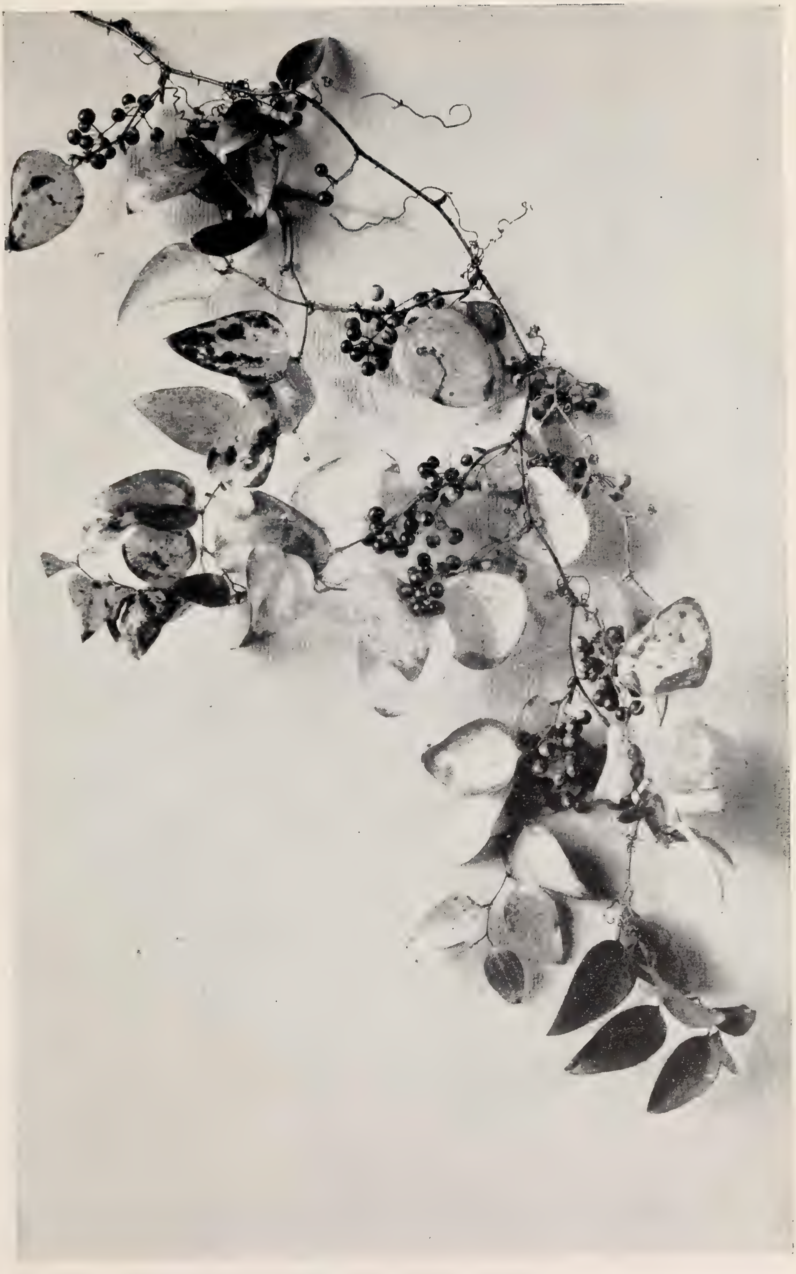
Shepherdia canadensis (L.) Nutt. **Canadian buffaloberry.**
Lepargyrea canadensis (L.) Greene, *Elaeagnus canadensis* (L.) Nelson.
Range: 2, 12, 13, 14, 15 (Black Hills), 18, 21, 23, 24, 26, 27.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available July–September.

A small to large, dioecious shrub; flowers April–June; typical of moist, open, wooded slopes; root system compact, fibrous, rather shallow; commonly occurs on calcareous soil.

Stomach records: Seven species of birds, including dusky grouse. *Observations:* Bohemian and cedar waxwings, sharp-tailed grouse; Alpine chipmunk; casually browsed by northern white-tailed deer. Without browse value for cattle; of limited value for sheep before frost.

Shepherdia rotundifolia Parry.
Lepargyrea rotundifolia (Parry) Greene, *Elaeagnus rotundifolia* (Parry) Nelson.
Range: 9, 11.
Site: Dry, sun.
Fruit: Berry.

A small, densely branched evergreen shrub; flowers in March; commonly sprawling; often occurs in clay soil. Considered a valuable winter food for livestock in southeastern Utah.



Smilax glauca. A fruiting branch collected in midwinter in Maryland. The thicket-forming tendency of this and other species of *Smilax* make them valuable erosion-control plants on submarginal land where they provide food and cover for wildlife as well as cover for soil.

A, *Sorbus sitchensis.* A species with promise for erosion-control and wildlife plantings at higher elevations in the West. *B*, *Shepherdia argentea,* a fruit-bearing shrub of value to wildlife and of great potential use in erosion-control planting. *C*, *Simmondsia chinensis.* The goat nut provides a thick cover in the desert region where cover is at a premium. Its nutlike seed is utilized by wildlife.

Siderocarpos flexicaulis, see *Pithecolobium flexicaule.*

Sideroxylon lanuginosa, see *Bumelia lanuginosa.*

Simmondsia californica, see *Simmondsia chinensis.*

Simmondsia chinensis (Link) Schneid. (pl. 40, *C*). **Goat-nut.**
S. californica Nutt., S. *pabulosa* Kellogg, *Buxus chinensis* Link.
Range: 5, 10.
Site: Dry, sun.
Fruit: Capsule, available August–September.

A small to large, bushy monoecious or dioecious shrub; slow growing, fruit often produced in great quantities; flowers in April; seed germination 80–100 percent; seedlings slow-growing.

Observations: Much eaten by squirrels; mule deer; white-winged doves. An important browse for livestock.

Simmondsia pabulosa, see *Simmondsia chinensis.*

Smilax spp.

Stomach records (in addition to specific records: Forty-four species of birds, including ruffed grouse, bobwhite, wild turkey, sharp-tailed grouse, ring-necked pheasant, and greater prairie chicken; composed 3.6 percent of the fall food of prairie chicken in Wisconsin; composed 1.0 percent of fall food of sharp-tailed grouse in Wisconsin; gray fox, white-tailed deer. *Observations* (in addition to specific records): Twelve species of birds, considerably eaten by marsh rabbit; cottontail rabbit.

Smilax auriculata Walt. **Wild-bamboo.**
Range: 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry.

An evergreen vine; unarmed, or with small prickles, rootstocks bearing large tubers; occurs in sandy and other soils.

Observations: Captive marsh rabbit.

Smilax bona-nox L. **Fringed greenbrier.**
Range: 11, 16, 17, 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available October–November.

A spiny vine, partially evergreen; flowers in June; root-stocks bearing large tubers. (See also *S. pseudochina.*)

Stomach records: Thirteen species of birds, including ruffed grouse. *Observations:* Captive marsh rabbit.

Smilax californica Gray. **California greenbrier.**
Range: 4.
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available July–November.

A smooth or prickly vine; commonly spreads by rootstocks.

Smilax cinnamomifolia, see *Smilax lanceolata.*

Smilax glauca Walt. (pl. 39). **Sawbrier.**
Range: 20, 21, 22, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Berry, available September–October, often persistent until spring.

A partially evergreen vine; flowers in June; occurs on sand, clay, and other soils; underground stems deep, bearing large tubers; often troublesome in clearings and meadows; comparatively difficult to eradicate; thicket forming; very tolerant of fire.

Stomach records: Seven species of birds, including ruffed grouse. *Observations:* Captive marsh rabbit.

Smilax hispida Muhl. **Bristly greenbrier.**
Range: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Berry; available October–November, commonly persistent until spring.

A high-climbing vine; grows well on poor soils including sand; does not spread by stolons.
Observations: Wild turkey.

Smilax lanceolata L. Coral greenbrier.
S. cinnamomifolia Small.
Range: 20, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Berry, available in September.
A vigorous, evergreen vine; prickly or unarmed; rootstocks commonly fleshy; production of fruit uncertain.
Observations: Captive marsh rabbit. Browsed by cattle.

Smilax laurifolia L. Laurel greenbrier.
Range: 20, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available August–September of the second season.
A very vigorous, high-climbing evergreen vine; not thorny; commonly forms large entanglements; fruit very abundantly produced; rootstocks commonly bearing very large tubers which may be used for propagation purposes.
Stomach records: Three species of birds. *Observations:* Refused by captive marsh rabbits.

Smilax pseudochina L. Chinabrier.
Range: 16, 20, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Berry.
An evergreen vine; commonly occurs in sandy and other soils; rootstocks often bear large tubers. By some authorities considered identical with *S. bona-nox.*
Stomach records: Mockingbird.

Smilax pumila Walt. Sarsparilla vine.
Range: 20, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available in spring, persistent the year round.
A trailing or low-climbing, unarmed vine; flowers in the fall.
Observations: Captive marsh rabbit.

Smilax renifolia Small.
Range: 17, 30.
Site: Well-drained, moist, sun.
Fruit: Berry.
A high-climbing dioecious vine.

Smilax rotundifolia L. Catbrier.
Range: 20, 22, 23, 24, 25, 26, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Berry, available in October, persistent throughout the winter.
A thicket-forming, evergreen, spiny vine; rootstocks tuberous, very long.
Stomach records: Ten species of birds, including ruffed grouse. *Observations:* Pileated woodpecker; captive marsh rabbit, opossum.

Smilax walteri Pursh. Coral greenbrier.
Range: 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available September–October, persistent all winter, especially southward.
An unarmed, or rarely somewhat prickly vine; flowers in June.
Stomach records: Two species of birds. *Observations:* Captive marsh rabbit.

Solanum dulcamara L. Bitter nightshade.
Range: 2, 6, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available August–May.
A thicket-forming vine; flowers May–September; introduced from Eurasia and more or less naturalized in the regions indicated; often only herbaceous; not a dermatitic poison; berries not poisonous when cooked; often considered a weed. Species of *Solanum* commonly harbor the potato and tomato mosaic as well as potato stalk borer, Colorado potato beetle, onion thrip, and green-

house red spider mite. For this reason the species should be used with considerable caution.

Stomach records: Eight species of birds, including ruffed grouse, bobwhite, and ring-necked pheasant; composed 0.3 percent of total annual food, and 3.9 percent of fruit food of ring-necked pheasant in Michigan. *Observations:* Red-eyed vireo; an important food of pheasants in southern Michigan; black duck, white-tailed deer, cottontail rabbit.

Sophora affinis Torr. and Gray. **Coralbean.**
Range: 10, 16, 20, 25, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Legume; available September–October, persistent through the winter.

A large shrub to small tree; flowers in June; occurs in limestone and other soils.

Sophora arizonica Wats.
Range: 10, 11.
Site: Dry, well-drained, sun.
Fruit: Legume, available in May.

A large, handsome, shrub; flowers in March.

Sophora secundiflora (Cav.) DC. **Frigolito.**
Broussonetia secundiflora Orteg.
Range: 11, 16, 17, 20, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Legume, available in September.

A large shrub, or rarely a small to large tree; evergreen; often occurs on limestone soil; seeds contain sophorin and are extremely poisonous; thicket forming; propagation is by seeds sown at once; growth of seedlings very slow. Poisonous to livestock as well as human beings.

Sophora tomentosa L.
Range: 17, 32.
Site: Well-drained, sun.
Fruit: Legume.

A small to large, evergreen shrub; flowers the year round; commonly occurs in sandy soils.

Sorbus spp. **Mountain-ashes.**

Propagation of all species is by seeds stratified 90 days at 32°–41° F. and sown in spring.

Stomach records (in addition to specific records): Nine species of birds, including ruffed, sooty, and sharp-tailed grouse. *Observations* (in addition to specific records): Eleven species of birds, including ruffed grouse, ring-necked pheasant, sharp-tailed grouse; a favorite food of moose.

Sorbus americana Marsh. **American mountain-ash.**
Pyrus americana (Marsh) DC., *P. sambucifolia* of auths., not Cham. and Schlecht.
Range: 23, 24, 26, 27.
Site: Dry, well-drained, moist, sun.
Fruit: Pome, available August–March.

A small to large tree; flowers May–June; fruit commonly bearing very few seeds; very susceptible to San José scale; 83,000–100,000 seeds per pound.

Var. *decora* (Schneid.) Sarg. (*Pyrus sitchensis* of Gray's Man., not Piper, *S. decora* Schneid.), occurs in regions 24 and 27.

Stomach records: Eight species of birds including ruffed grouse, ptarmigan, and sharp-tailed grouse; composed 17.9 percent of winter food of sharp-tailed grouse in Ontario and Quebec. *Observations:* Thirteen species of birds; preferred winter food of ruffed grouse in Wisconsin; blue grouse; fruits claimed preferred by birds to that of *S. aucuparia* when the two species are available together; white-tailed deer; of importance as browse for moose; much eaten by fisher; a staple food of marten.

Sorbus angustifolia, see *Sorbus sitchensis.*

Sorbus aucuparia L. **European mountain-ash.**
Range: 21, 22, 27.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Pome, available August–September.

A large shrub or more commonly a small tree; introduced from Europe and more or less naturalized in the regions indicated; commonly produces more viable seeds than *S. americana;* 104,700 seeds per pound.

Observations: Three species of birds, including sharp-tailed grouse; songbirds generally; claimed to be a second choice of birds where this and *S. americana* grow together.

Sorbus californica, see *Sorbus sitchensis.*

Sorbus decora, see *Sorbus americana.*

Sorbus dumosa, see *Sorbus scopulina.*

Sorbus occidentalis (Wats.) Greene. **Alpine mountain-ash.**
S. pumila Raf., *Pryus occidentalis* Wats.,
Range: 4, 12.
Site: Well-drained, sun.
Fruit: Pome, available August–December.

A large shrub; flowers June–August.

Observations: Oregon jay; Clark's crow. Important locally as browse for livestock, although susceptibility to rust lessens the browse value.

Sorbus pumila, see *Sorbus occidentalis.*

Sorbus scopulina Greene. **Greene mountain-ash.**
S. dumosa Greene.
Range: 4, 9, 10, 12, 13, 14.
Site: Well-drained, moist, sun, shade.
Fruit: Pome, available July–December.

A large shrub to small tree; flowers in June; commonly occurs in sandy or gravelly soil.

Stomach records: Dusky grouse. Where in association with highly palatable species is little cropped by livestock; elsewhere excellent browse for sheep.

Sorbus sitchensis Roem. (pl. 40, *A*). **Pacific mountain-ash.**
S. angustifolia Rydb. (?), *S. californica* Greene, *Pyrus sitchensis* (Roem.) *Piper.*
Range: 4, 12.
Site: Dry, well-drained, moist.
Fruit: Pome, available August–November.

A large shrub to small tree; flowers in June; thicket forming; occurs in sandy loam and other soils.

Stomach records: Three species of birds, including Richardson's grouse. Fair browse for sheep, less so for cattle.

Sphaeralcea davidsonii, see *Malvastrum davidsonii.*

Sphaeralcea fasciculata, see *Malvastrum fasciculatum.*

Spiraea spp. **Spiraeas.**

Nearly all species are free from insects and diseases; most occur in neutral soil.

Stomach records (in addition to specific records): Ruffed grouse, sharp-tailed grouse; mountain sheep. *Observations* (in addition to specific records): Pica, cottontail rabbit. Palatability of the western species to livestock is low.

Spiraea albla Du Roi. **Meadow spiraea.**
Range: 15 (Black Hills), 21, 22, 25, 26, 27, 28.
Site: Well-drained, moist, sun.
Fruit: Follicle.

A small shrub: flowers June–August.

A possible hybrid between this and *S. tomentosa* has been described as *S. subcanescens* Rydb. It occurs in region 28.

Spiraea arbuscula, see *Spiraea densiflora.*

Spiraea caespitosa Nutt. **Dwarf spiraea.**
Petrophytum caespitosum (Nutt.) Rydb., *P. acuminatum* Rydb.
Range: 4, 9, 10, 11, 13, 15.
Site: Dry, sun.
Fruit: Follicle.

A small, mat-forming shrub; flowers in May; occurs on limestone and other soils; will grow over dry bare rocks.

Spiraea californica, see *Vauquelinia californica.*

Spiraea corymbosa Raf. **Dwarf spiraea.**
Range: 27, 28.
Site: Well-drained, sun.
Fruit: Follicle.
A small, sparsely-branched shrub; flowers May–June.

Spiraea densiflora Nutt.
S. arbuscula Greene, *S. helleri* Rydb., *S. splendens* Koch.
Range: 1, 4, 12, 13, 15 (Black Hills).
Site: Dry, well-drained, sun.
Fruit: Follicle.
A small shrub, flowers July–August; forms dense mats.

Spiraea discolor, see *Holodiscus discolor.*

Spiraea douglasii Hook. **Douglas spiraea.**
Range: 1, 2, 3, 4.
Site: Well-drained, moist, sun.
Fruit: Follicle, available September–October.
A small to large shrub; flowers July–August; thicket forming by means of suckers.

Spiraea dumosa, see *Holodiscus dumosus.*

Spiraea glutinosa, see *Chamaebatiaria millefolium.*

Spiraea helleri, see *Spiraea densiflora.*

Spiraea latifolia (Ait.) Borkh. **Meadowsweet.**
Range: 26, 27.
Site: Well-drained, moist, sun.
Fruit: Follicle.
A large, thicket-forming shrub; flowers June–August.
Stomach records: Ruffed grouse. *Observations:* Ignored by deer in Massachusetts; casually browsed by northern white-tailed deer in northern Michigan.

Spiraea lucida Dougl.
Range: 2, 4, 6, 7, 12, 13, 15 (Black Hills).
Site: Well-drained, sun.
Fruit: Follicle.
A small, sparsely branched shrub; flowers May–July; possesses creeping rootstocks; erect branches often die back annually too near the base. A possible hybrid between this and *S. menziesii* has been described as *S. pyramidata* Greene. It occurs in regions 1, 2, 4, and 12.

Spiraea menziesii Hook. **Menzies spiraea.**
Range: 2, 4, 7, 8, 12.
Site: Moist, sun.
Fruit: Follicle.
A small shrub; flowers June–August. Fair to good forage in the fall for sheep and cattle.

Spiraea millefolium, see *Chamaebatiaria millefolium.*

Spiraea opulifolia, see *Physocarpus opulifolius.*

Spiraea pauciflora, see *Physocarpus malvaceus.*

Spiraea pyramidata, see *Spiraea lucida.*

Spiraea salicifolia L. **Willowleaf spiraea.**
Range: 25, 27.
Site: Well-drained, moist, sun.
Fruit: Follicle.
A small to large shrub; introduced from Siberia and eastern Russia and more or less escaped and naturalized in the regions indicated.
Observations: Ring-necked pheasant; cottontail rabbit.

Spiraea splendens, see *Spiraea densiflora.*

Spiraea subcanescens, see *Spiraea alba.*

Spiraea tomentosa L. **Hardhack.**
Range: 21, 22, 23, 24, 25, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Follicle, available August–December.

A small shrub; flowers July–September; possesses underground stems; long considered an aggressive weed in New England pastures.

Observations: Ignored by white-tailed deer in Massachusetts.

Spiraea virginiana Britt. **Virginia spiraea.**
Range: 27.
Site: Dry, sun.
Fruit: Follicle, available in September.

A small, straggling shrub; flowers in June.

Spirostachys occidentalis, see *Allenrolfea occidentalis.*

Staphylea bolanderi Gray. **California bladdernut.**
Range: 4.
Site: Dry, well-drained, sun.
Fruit: Capsule, available August–September.

A large shrub to large tree; flowers April–May.

Staphylea trifolia L. **American bladdernut.**
Range: 22, 23, 24, 25, 26, 27, 28, 29.
Site: Moist, sun, shade.
Fruit: Capsule, available in September.

A large shrub to small tree; flowers in May.

Observations: Cottontail rabbit.

Stenolobium incisum, see *Tecoma stans.*

Stenolobium stans, see *Tecoma stans.*

Stenotopsis interior, *Aplopappus linearifolius.*

Stenotopsis linearifolius, see *Aplopappus linearifolius.*

Stenotus linearifolius, see *Aplopappus linearifolius.*

Stewartia, see *Stuartia.*

Stillingia aquatica Chapm. **Corkwood.**
Range: 29, 30.
Site: Moist, sun, shade.
Fruit: Capsule.

A small to large shrub; often grows in standing water.

Stomach records: Bobwhite.

Strobus monticola, see *Pinus monticola.*

Strobus strobus, see *Pinus strobus.*

Strobus weymouthiana, see *Pinus strobus.*

Strombocarpa cinerascens, see *Prosopis cinerascens.*

Stuartia malachodendron L. **Silky-camellia.**
Range: 28, 29, 30.
Site: Well-drained, sun.
Fruit: Woody capsule.

A large shrub; flowers June–August.

Stuartia pentagyna L'Her. **Mountain-camellia.**
Malachodendron pentagynum (L'Her.) Small.
Range: 27, 28.
Site: Well-drained, moist, sun, shade.
Fruit: Woody capsule.

A large shrub; flowers July–August.

Styphonia integrifolia, see *Rhus integrifolia.*

Styrax americana L. **American snowbell.**
Range: 25, 27, 28, 29, 30.
Site: Moist, sun, shade.
Fruit: Drupe, available September–October.

A large shrub; flowers March–April.
Stomach records: Mallard.

Styrax fulvescens, see *Styrax officinalis.*

Styrax grandifolia Ait. **Snowbell.**
Range: 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Dry drupe, available in October.
A large shrub to small or large tree; flowers March–May; occurs in sandy and other soils.
Stomach records: Wood duck.

Styrax officinalis L.
A Mediterranean species represented in California by var. *californica* Munz and Johnst., a large shrub; in regions 4 and 10; flowering May–July. Var. *fulvescens* (Eastw.) Munz and Johnst. (*Styrax fulvescens* Eastw.) is a similar plant in regions 5 and 10.
The fruit of both is a capsule, and both occur in sunny sites which are dry or well-drained.

Styrax platanifolia Engelm. **Storax.**
Range: 20, 29.
Site: Moist, sun.
Fruit: Stony capsule.
A large, handsome shrub.

Styrax pulverulenta Michx. **Powdery storax.**
Range: 27, 28, 29, 30.
Site: Moist, sun.
Fruit: Capsule.
A small to large shrub; flowers March–April. Very similar to *S. americana.*
Stomach records: Mallard.

Svida alternifolia, see *Cornus alternifolia.*

Svida amomum, see *Cornus amomum.*

Svida asperifolia, see *Cornus asperifolia.*

Svida baileyi, see *Cornus baileyi.*

Svida californica, see *Cornus californica.*

Svida catalinensis, see *Cornus glabrata.*

Svida foemina, see *Cornus foemina.*

Svida interior, see *Cornus interior.*

Svida microcarpa, see *Cornus microcarpa.*

Svida priceae, see *Cornus priceae.*

Svida pubescens, see *Cornus occidentalis.*

Svida rugosa, see *Cornus circinata.*

Svida stricta, see *Cornus foemina.*

Svida stolonifera, see *Cornus stolonifera.*

Symphoricarpos spp.
All species may be propagated by soft or hardwood cuttings cut below the node and treated with potassium permanganate, or they may be propagated by seed. Many species contain small amounts of saponin, but such large quantities are necessary to cause acute poisoning that cases of livestock poisoning are rare.
Stomach records (in addition to specific records): Twenty-six species of birds, including ruffed grouse, dusky grouse, sharp-tailed grouse, ring-necked pheasant, and California quail; black-tailed deer, plains white-tailed deer. *Observations* (in addition to specific records): Six species of birds; much eaten by ring-necked pheasant; Hungarian partridge; pica, Columbian black-tailed deer. Extremely important browse for livestock in Utah, Nevada, and southern Idaho; cases of livestock sickness charged to this genus appear to be extremely rare.

Symphoricarpos acutus, see *Symphoricarpos albus.*

Symphoricarpos albus (L.) Blake. (pl. 41, *A*). **Snowberry.**

S. racemosus Michx., *S. mollis* Nutt., *S. acutus* (Gray) Howell, *S. albus mollis* (Nutt.) Keck.

Range: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 18, 21, 22, 23, 24, 25, 26, 27, 28.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available year round.

A small, thicket-forming shrub; flowers June–September; occurs on limestone and other soils; declined branches root; killed by excessive grazing; 72,000–95,000 seeds per pound.

Var. *laevigatus* (Fern.) Blake, is taller, has larger leaves, larger clusters of fruit, and larger fruit than the species. It occurs within the range of the species. Var. *pauciflorus* Blake, (*S. pauciflorus* Britt.), is a dwarf occurring within the range of the species.

Stomach records: Nineteen species of birds, including ruffed grouse, California quail, ring-necked pheasant, Hungarian partridge, sharp-tailed grouse, and Richardson's grouse; plains white-tailed deer. *Observations:* Hungarian partridge, sharp-tailed grouse, prairie sharp-tailed grouse, ring-necked pheasant, bobwhite; of slight importance as browse for mule deer. A very important browse for livestock.

Symphoricarpos fragrans, see *Symphoricarpos longiflorus.*

Symphoricarpos glabratus, see *Symphoricarpos oreophilus.*

Symphoricarpos glaucus, see *Symphoricarpos rotundifolius.*

Symphoricarpos longiflorus Gray.

S. fragrans Nels.

Range: 9, 10, 11, 13.
Site: Dry, sun.
Fruit: Berry.

A small shrub, with somewhat declining branches.

Symphoricarpos mollis, see *Symphoricarpos albus.*

Symphoricarpos occidentalis Hook. **Wolfberry.**

Range: 15, 18, 21, 22, 23, 24.
Site: Dry, well-drained, sun.
Fruit: Berry, available September–January.

A small shrub; flowers June–July; commonly reproduces by rootstocks; very similar to *S. albus*, but generally stouter.

Stomach records: Five species of birds, including greater prairie chicken. *Observations:* Five species of birds; a fairly important food of ring-necked pheasant. An important and nonpoisonous browse for livestock. A good honey plant.

Symphoricarpos orbiculatus Moench. **Coralberry.**

S. vulgaris Michx., *S. symphoricarpos* (L.) MacM.

Range: 18, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available September–June.

A small shrub, or very rarely, a large shrub; flowers in July; thicket forming by means of stolons which are freely produced; grows on coal-stripped land in Illinois; has demonstrated great adaptability to rigorous conditions and high value for erosion control of the most barren and sterile soils in the Piedmont; has been effectively used as living check dams and water spreaders; commonly bears fruit soon after planting; often weedy in pastures; 407,000 seeds per pound.

Stomach records: Nine species of birds, including ruffed grouse, bobwhite, sharp-tailed grouse, ring-necked pheasant, greater prairie chicken, and wild turkey. *Observations:* Ring-necked pheasant, white-tailed deer.

Symphoricarpos oreophilus Gray. **Mountain snowberry.**

S. rotundifolius oreophilus Jones, *S. glabratus* Eastw., *S. parishii* Rydb.

Range: 4, 9, 10, 11, 12, 13, 14.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available August–September.

A small, stoloniferous shrub; flowers June–July; root system fibrous, generalized; often trailing or with procumbent branches.

Stomach records: Black-tailed deer. *Observations:* Wasatch chipmunk, deer. A valuable forage for livestock.

Symphoricarpos parishii, see *Symphoricarpos oreophilus.*

Symphoricarpos parvifolius, see *Symphoricarpos rotundifolius.*

Symphoricarpos pauciflorus, see *Symphoricarpos albus.*

Symphoricarpos racemosus, see *Symphoricarpos albus.*

Symphoricarpos rotundifolius, Gray. **Roundleaf snowberry.**
S. glaucus Eastw., *S. parvifolius* Eastw., *S. vaccinioides* Rydb., *S. tetonensis* Nels.
Range: 4, 9, 10, 11, 12, 13, 14.
Site: Dry, well-drained, sun.
Fruit: Berry, available July–September.

A small, straggling shrub; flowers May–June.

Stomach records: Varied thrush, California quail. *Observations:* Chipmunk, California mule deer. Fair to good sheep and goat browse.

Symphoricarpos symphoricarpos, see *Symphoricarpos orbiculatus.*

Symphoricarpos tetonensis, see *Symphoricarpos rotundifolius.*

Symphoricarpos utahensis Rydb. **Utah snowberry.**
Range: 9, 12, 13.
Site: Dry, well-drained, sun.
Fruit: Berry.

A small shrub.

Symphoricarpos vaccinioides, see *Symphoricarpos rotundifolius.*

Symphoricarpos vulgaris, see *Symphoricarpos orbiculatus.*

Symplocos tinctoria (L.) L'Her. **Sweetleaf.**
Hopea tinctoria L.
Range: 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe, available August–September.

A large shrub to small or large tree; semievergreen; flowers March–May, the two forms occurring along the coast and in the mountains respectively are by some considered specifically distinct.

Stomach records: Phoebe. Relished by cattle.

Talinopsis frutescens Gray.
Range: 11.
Site: Dry, sun.
Fruit: Capsule.

A small shrub.

Tamala borbonia, see *Persea borbonia.*

Tamala humilis, see *Persea humilis.*

Tamala pubescens, see *Persea pubescens.*

Tamarix gallica L. **Tamarisk.**
Range: 3, 4, 9, 10, 11, 13, 16, 19, 22, 25, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule.

A large shrub to small tree; foliage comparatively sparse; introduced from Europe but more or less naturalized in the regions indicated; withstands continued drought well; not easily hurt by alkali in the soil; generally free from insects and disease; thicket forming; grows rapidly from cuttings.

Taxodium spp. **Baldcypress.**

Stomach records (in addition to specific records): Eleven species of birds, including wild turkey. *Observations* (in addition to specific records): Texas fox squirrel.

Taxodium ascendens Brongn. **Pondcypress.**
T. imbricarium (Nutt.) Harp.
Range: 29, 30.
Site: Well-drained, moist, sun.
Fruit: Cone.

A large tree.

Stomach records: Little brown crane.

Taxodium distichum (L.) Rich. Southern cypress.
Range: 17, 20, 25, 28, 29, 30, 31, 32.
Site: Dry, well-drained, moist, sun.
Fruit: Cone.

A large tree; root system shallow, with "knees" in wet situations; at first rapid growing, later slower; somewhat attacked by fungi; wood of great importance commercially, especially durable; heavy seed years frequent; 3,000 seeds per pound 15–25 percent viable, vitality transient (1 year or less).

Stomach records: Six species of birds.

Taxodium imbricarium, see *Taxodium ascendens.*

Taxus brevifolia Nutt. Pacific yew.
Range: 1, 2, 4, 12.
Site: Well-drained, moist, sun, shade.
Fruit: Drupelike, available in September, falling in October.

A small to large, evergreen tree with very dense foliage; extremely slow growing, very long-lived; attacked at maturity by heart rot; wood very durable, little used commercially; germination of seeds 50–60 percent, vitality persistent.

Observations: Much eaten by birds; ring-tailed cat. Poisonous to cattle.

Taxus canadensis Marsh. Canada yew.
Range: 21, 22, 23, 24, 26, 27.
Site: Well-drained, moist, sun (rare), shade.
Fruit: Drupelike, available August–September of the second season.

A small evergreen shrub with dense foliage; commonly forms a continuous ground cover; prostrate branches root where covered by detritus; fruit produced sporadically.

Stomach records: Three species of birds, including ruffed grouse. *Observations:* Third most important preferred winter food of white-tailed deer in Massachusetts; highly palatable winter and summer food for moose on Isle Royale; favorite food of northern white-tailed deer in Michigan. Poisonous to livestock, although the pulp of the fruit is harmless.

Taxus floridana Nutt. Florida yew.
Range: 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Drupelike, available in fall.

A small evergreen tree; very local in distribution; wood not used commercially because scarce.

Tecoma radicans, see *Campsis radicans.*

Tecoma stans (L.) H. B. K. Trumpetflower.
Bignonia stans L., *Stenolobium stans* v. Seem., *S. incisum* Rose and Standl.
Range: 10, 11, 17, 20, 29, 30.
Site: Dry, sun.
Fruit: Capsule.

A small shrub to small tree; much cultivated.

Stomach records: Mountain sheep. Without browse value for livestock.

Tessaria borealis, see *Pluchea sericea.*

Tetracoccus dioicus Parry.
Range: 5.
Site: Dry, sun.
Fruit: Capsule, available July–November.

A small much-branched dioecious shrub.

Tetracoccus hallii, see *Halliophytum hallii.*

Tetracoccus ilicifolius Cov. and Gilm. Hollybush.
Range: 10.
Site: Dry, well-drained, sun.
Fruit: Capsule, available August–September.

A small evergreen shrub; growth open and spreading; very rare.

Tetradymia spp.

Observations (in addition to specific records): Pigmy rabbit; Oregon jack rabbit in dry seasons.

Tetradymia axillaris, see *Tetradymia spinosa.*

Tetradymia canescens DC. **Gray horsebrush.**
T. linearis Rydb.
Range: 4, 6, 7, 8, 9, 10, 13, 14.
Site: Dry, sun.
Fruit: Achene.

A small, freely-branched shrub; flowers July–August; occurs in sandy and rocky soils.

Var. *inermis* (Nutt.) Gray, (*T. inermis* Nutt.) the spineless horsebrush, occurs with the species, often on alkaline soil. Considered worthless or poor winter feed for stock; possibly poisonous to sheep.

Tetradymia comosa Gray. **Hairy horsebrush.**
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small, many-stemmed shrub.

Tetradymia glabrata Gray. **Littleleaf horsebrush.**
Range: 8, 9, 10.
Site: Dry, sun.
Fruit: Achene.

A small shrub; flowers June–August; commonly without leaves from about June 15. Generally not palatable to livestock; sheep poisoned by it, especially when taken in large quantities in the spring; poisonous effect cumulative; apparently not poisonous to cattle.

Tetradymia inermis, see *Tetradymia canescens.*

Tetradymia linearis, see *Tetradymia canescens.*

Tetradymia longispina, see *Tetradymia spinosa.*

Tetradymia nuttallii Torr. and Gray. **Nuttall horsebrush.**
Range: 9, 13.
Site: Dry, sun.
Fruit: Achene.

A small prickly shrub; flowers May–August; of local browse value for sheep.

Tetradymia spinosa Hook. and Arn. **Shortspine horsebrush.**
Range: 8, 9, 10.
Site: Dry, sun.
Fruit: Achene.

A small, rigid, divaricately-branched shrub; flowers May–August; somewhat spiny. Var. *longispina* Jones, (*T. longispina* (Jones) Rydb., *T. axillaris* Nels.) occurs in the southern part of the range.

Observations: A valuable forage for antelope. Locally valuable as a forage for sheep.

Tetradymia squamata, see *Lepidospartum squamatum.*

Tetradymia stenolepis Greene. **Mohave horsebrush.**
Range: 4, 10.
Site: Dry, sun.
Fruit: Achene.

A small, much-branched shrub.

Thamnosma montana Torr. and Frem. **Turpentine-broom.**
Range: 9, 10, 11.
Site: Dry, sun.
Fruit: Capsule.

A small shrub; flowers April–May; branches broomlike; leaves early deciduous. Not palatable to livestock.

Thuja spp. **Arborvitae.**

Stomach records (in addition to specific records): Four species of birds, including ruffed grouse.

Thuja occidentalis L. **Northern white cedar.**
Range: 22, 23, 24, 26, 27.
Site: Dry, well-drained, sun, shade.
Fruit: Cone; mature in early autumn, persistent through the winter.

A small to large, evergreen tree; root system usually shallow, or deeper on dry sites; slow growing, long-lived; very easily damaged by fire and wind; mature trees often decay at the base; wood durable, important commercially;

some 50 varieties are known in cultivation; 184,000–412,000 seeds per pound, germination 44 percent.

Stomach records: Armadillo. *Observations:* Redpoll, pine siskin; staple food of white-tailed deer; eaten extensively by red squirrel; winter food of moose, but not relished, on Isle Royale; snowshoe hare; cottontail rabbit.

Thuja plicata Don. **Western red cedar.**
Range: 1, 2, 4, 6, 7, 12.
Site: Well-drained, moist, sun, shade.
Fruit: Cone; mature in August, opening in September, persistent until the following summer.

A large evergreen tree; root system shallow; wind-firm, except on wet soils; develops best in a humid climate; slow growing, long-lived; easily fire-damaged; without notable insect enemies, or fungi, until mature; heavy seed crop produced every 2 or 3 years; wood durable, of great importance commercially; 203,000–504,000 seeds per pound, germination 52–73 percent, vitality transient, some 13 varieties distinguished in cultivation.

Stomach records: Plains white-tailed deer. *Observations:* Bark commonly used by Richardson's pine squirrel for nest material; an important browse for deer in the northern Rocky Mountains.

Thurberia thespesioides, see *Thurberia triloba.*

Thurberia triloba (DC.) Tidest. **Arizona wild cotton.**
T. thespesioides of auths, not Gray, *Ingenhouzia triloba* DC.
Range: 10, 11, 14.
Site: Dry, well-drained, sun.
Fruit: Capsule, available August–September.

A large, sparsely-branched shrub; flowers May–July; growth more vigorous on moist areas protected from wind; distribution extremely local; will not grow where soil is too dry; a native host plant of the wild cotton boll weevil, which also feeds on cultivated cotton, and for this reason restricted by plant quarantine.

Scarcely palatable to cattle but somewhat nibbled by sheep and goats.

Tilia spp. **Basswoods.**

The taxonomy of this group is much confused, owing in great part to the fact that the species vary considerably and that hybrids are apparently easily formed. Propagation of all species is by seed stratified as soon as ripe and planted in spring; dried seed may require 2 years for germination. Many species attacked by Texas root rot disease caused by *Phymatotrichum omnivorum.*

Stomach records (in addition to specific records): English sparrow, bobwhite; Franklin ground squirrel, white-tailed deer. *Observations* (in addition to specific records): Redpoll; porcupine, fox squirrel, white-tailed deer; staple food of cottontail rabbit; eastern chipmunk.

Tilia alabamensis, see *Tilia floridana.*

Tilia americana, see *Tilia glabra.*

Tilia apposita, see *Tilia caroliniana.*

Tilia australis Small.
Range: 27.
Site: Well-drained, sun.
Fruit: Nutlike.

A large tree.

Tilia caroliniana Mill.
T. apposita Ashe, *T. lata* Ashe, *T. pubescens* Ait.
Range: 20, 29, 30.
Site: Well-drained, sun.
Fruit: Nutlike, available in July.

A large tree; flowers in May.

Var. *rhoophila* Sarg. occurs in regions 17, 20, 29, and 30.

Tilia cinerea, see *Tilia truncata.*

Tilia cocksii Sarg. **Basswood.**
Range: 29.
Site: Well-drained, moist, sun.
Fruit: Nutlike, available in July.

A small tree; flowers in May.

Tilia crenoserrata, see *Tilia floridana.*

Tilia eburnea, see *Tilia lasioclada.*

Tilia floridana Small.
T. alabamensis Ashe, *T. crenoserrata* Sarg.
Range: 17, 20, 25, 27, 29, 30.
Site: Well-drained, sun.
Fruit: Nutlike, available August–September.
A large tree; flowers in May.
Var. *alabamensis* Ashe, (*T. alabamensis* Ashe, var. *oblongifolia* Sarg., *T. oblongifolia* Sarg.) occurs in region 29. Var. *hypoleuca* Sarg. (*T. hypoleuca* Ashe) occurs in region 25 and has been also considered a variety of *T. glabra.*

Tilia fulva, see *Tilia glabra.*

Tilia georgiana Sarg. **Basswood.**
T. pubescens Vent., not Ait.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Nutlike, available in September.
A small to large tree.

Tilia glabra Vent. **Basswood.**
T. americana L., in part, *T. fulva* Raf., *T. venulosa* Sarg.
Range: 20, 21, 22, 23, 24, 25, 26, 27.
Site: Dry, well-drained, moist, sun.
Fruit: Nutlike, available August–October, sometimes persistent.
A large tree; flowers May–July; root system deep, wide spreading; rapid growing, rather short-lived; attacked by rots and insects; resistant to fire when older; coppices freely; wood not durable, of importance commercially; 3,500–6,500 seeds per pound, germination 10–15 percent.
Stomach records: Four species of birds, including ruffed grouse and bobwhite; gray eastern chipmunk. *Observations:* Pinnated grouse; cottontail rabbit, white-tailed deer. A valuable honey plant.

Tilia heterophylla Vent. **White basswood.**
T. tenera Ashe.
Range: 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Nutlike, available August–September.
A large tree; flowers May–July; root system deep, wide spreading; rapid growing, short-lived; coppices freely; wood used commercially.
Var. *michauxii* (Nutt.) Sarg., (*T. michauxii* Nutt.), occurs in regions 22, 25, 27, 28, and 29.

Tilia hypoleuca, see *Tilia floridana.*

Tilia lasioclada Sarg. **Basswood.**
T. eburnea Ashe.
Range: 27, 28, 29, 30.
Site: Well-drained, sun.
Fruit: Nutlike, available in September.
A large tree; flowers in May; commonly occurs on rich soils.

Tilia lata, see *Tilia caroliniana.*

Tilia leucocarpa Ashe. **Basswood.**
T. nuda Sarg.
Range: 20, 29.
Site: Well-drained, moist, sun.
Fruit: Nutlike, available July–September.
A small or large tree.

Tilia littoralis Sarg.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Nutlike.
A large tree; flowers in June; very locally distributed.

Tilia michauxii, see *Tilia heterophylla* and *T. neglecta.*

Tilia monticola, see *Tilia truncata.*

Tilia neglecta Spach.
T. michauxii Sarg., not Nutt., *T. pubescens* Sarg., not Ait.
Range: 22, 23, 24, 26, 27.
Site: Well-drained, sun.
Fruit: Nutlike, available in September.
A large tree; flowers June–July.

Tilia nuda, see *Tilia leucocarpa.*

Tilia oblongifolia, see *Tilia floridana.*

Tilia phanera Sarg.
Range: 17, 20.
Site: Well-drained, sun.
Fruit: Nutlike, available in September.
A small to large tree; flowers in June; rare and local. Var. *scabrida* Sarg., occurs in regions 11, 20, and 30.

Tilia pubescens, see *Tilia caroliniana, T. georgiana,* and *T. neglecta.*

Tilia tenera, see *Tilia heterophylla.*

Tilia texana Sarg. **Basswood.**
Range: 17, 20, 29, 30.
Site: Well-drained, sun.
Fruit: Nutlike.
A small tree; flowers in June.

Tilia truncata Spach. **Basswood.**
T. cinerea Raf., *T. monticola* Sarg.
Range: 27.
Site: Well-drained, sun.
Fruit: Nutlike, available in September.
A large tree; flowers in July.

Tilia venulosa, see *Tilia glabra.*

Torreya californica, see *Tumion californicum.*

Torreya taxifolia, see *Tumion taxifolium.*

Toxicodendron biternatum, see *Rhus toxicodendron.*

Toxicodendron comarophyllum, see *Rhus diversiloba.*

Toxicodendron diversilobum, see *Rhus diversiloba.*

Toxicodendron eximium, see *Rhus toxicodendron.*

Toxicodendron fothergilloides, see *Rhus toxicodendron.*

Toxicodendron hesperinum, see *Rhus toxicodendron.*

Toxicodendron isophyllum, see *Rhus diversiloba.*

Toxicodendron macrocarpum, see *Rhus toxicodendron.*

Toxicodendron negundo, see *Rhus toxicodendron.*

Toxicodendron pinnatum, see *Rhus vernix.*

Toxicodendron punctatum, see *Rhus toxicodendron.*

Toxicodendron quercifolium, see *Rhus quercifolia.*

Toxicodendron radicans, see *Rhus toxicodendron.*

Toxicodendron rufescens, see *Rhus toxicodendron.*

Toxicodendron rydbergii, see *Rhus toxicodendron.*

Toxicodendron vernix, see *Rhus vernix.*

Toxylon pomiferum, see *Maclura pomifera.*

Trichostema arizonicum Gray. **Bluecurls.**
Range: 11.
Site: Dry, sun.
Fruit: Nutlike.
A small shrub.

Trichostema lanatum Benth.
T. parishii Vasey.
Range: 5.
Site: Dry, sun.
Fruit: Nutlike.
A small to large, leafy shrub; flowers May–June.

Trichostema parishii, see *Trichostema lanatum.*

Trixis californica Kellogg. **American trixis.**
Range: 10, 11.
Site: Dry, sun.
Fruit: Achene.
A small, bushy shrub. Lightly browsed by cattle in winter and early spring.

Tsuga spp. **Hemlocks.**
Stomach records (in addition to specific records): Nine species of birds, including ruffed grouse. *Observations* (in addition to specific records): Pine siskin; porcupine; Douglas' squirrel, Cascade squirrel, Sierra chickaree, Richardson's squirrel, Townsend's chipmunk, Cooper's chipmunk, Allen's chipmunk, Pacific mountain beaver, Olympic black bear; rarely cut for building material, not food, by beaver.

Tsuga canadensis (L.) Carr. **Eastern hemlock.**
Range: 22, 23, 24, 25, 27, 28.
Site: Well-drained, sun, shade.
Fruit: Cone, mature in October, seeds shed during winter, cones falling in the spring of the second year.
A large, evergreen tree; root system very shallow except in deep soils; generally free from fungi; easily killed by humus fires; attacked by eastern hemlock borer; easily wind damaged; wood of importance commercially; bark a valuable source of tannin; seed produced abundantly at intervals of 2 or 3 years; 144,000–279,000 seeds per pound, germination 30–60 percent; some 16 varieties in cultivation.
Stomach records: Eight species of birds, including ruffed grouse and sharp-tailed grouse; white-tailed deer. *Observations:* Nine species of birds; seventh most important preferred winter food of white-tailed deer in Massachusetts; browsed to some extent by northern white-tailed deer in Michigan; red squirrel, snowshoe hare, cottontail rabbit.

Tsuga caroliniana Engelm. **Carolina hemlock.**
Range: 27.
Site: Well-drained, sun, shade.
Fruit: Cone, mature September–October.
A large evergreen tree; root system shallow and spreading; wood of some importance commercially.

Tsuga heterophylla (Raf.) Sarg. **Western hemlock.**
Range: 1, 2, 4, 6, 12.
Site: Well-drained, sun, shade.
Fruit: Cone; mature in August, seeds shed September–October, cones falling by spring.
A large evergreen tree; root system shallow and spreading except on deep soils; slow growing, long-lived; easily injured by fire; susceptible to insect damage; wood of considerable importance commercially; 274,000–324,000 seeds per pound, produced abundantly at intervals of 2 or 3 years.
Stomach records: Two species of birds; plains white-tailed deer, black-tailed deer. *Observations:* Browsed as a last resort by Olympic wapiti.

Tsuga mertensiana (Bong.) Sarg. **Mountain hemlock.**
Hesperopeuce mertensiana (Bong.) Rydb.
Range: 4, 12.
Site: Well-drained, sun.
Fruit: Cone; seeds shed September–October, cones falling by spring.
A large evergreen tree; slow growing, probably long-lived; wood not used commercially; seed produced abundantly every several years; 102,000–207,000 seeds per pound, vitality transient.
Stomach records: Crow, sooty grouse.

Tulipastrum acuminatum, see *Magnolia acuminata.*

Tulipastrum cordatum, see *Magnolia cordata.*

Tumion californicum (Torr.) Greene. **California-nutmeg.**
Torreya californica Torr.
Range: 1, 4.
Site: Well-drained, moist, sun, shade.
Fruit: Drupelike, available September–October.

A large, dioecious, evergreen tree; wood durable, locally used for fence posts.

Tumion taxifolium (Arn.) Greene. **Stinking-cedar.**
Torreya taxifolia Arn.
Range: 30.
Site: Dry, well-drained, sun.
Fruit: Drupelike.

A large evergreen tree; commonly occurs on limestone soils; wood used locally for fence posts.

Tumionella monactis, see *Aplopappus cooperi.*
Tyria myricaefolia, see *Bernardia myricaefolia.*

Ulex europaeus L. **Gorse.**
Range: 1, 2, 27.
Site: Dry, well-drained, sun.
Fruit: Legume, available August–October.

A small to large, very spiny evergreen shrub; flowers May–July; foliage extremely dense; occurs on sand, loam, clay, and other soils; forms impenetrable thickets; introduced from Europe and locally established in the regions indicated; able to survive burial in sand; almost explosively inflammable; tolerant of saline conditions; aggressively spreading in regions 1 and 2.

Not grazed by livestock. Of some value as a honey plant.

Ulmus spp. **Elms.**

Stomach records (in addition to specific records): Seven species of birds, including ruffed grouse; white-tailed deer. *Observations* (in addition to specific records): Nine species of birds; an emergency food of pinnated grouse in Wisconsin and Iowa; greater prairie chicken; fox squirrel, red squirrel; a favorite food of muskrat.

All native species of elm are susceptible to the Dutch elm disease, caused by the fungus *Ceratostomella ulmi.* The virulence of the disease is very great and every effort should be made to prevent its further spread. Interstate movement of some species from certain States is prohibited because of the disease. The principal resistant species is the Asiatic *U. pumila.* Members of this genus are also seriously subject to the attacks of the Texas root rot caused by *Phymatotrichum omnivorum.*

Ulmus alata Michx. **Winged elm.**
Range: 17, 20, 25, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Samara, available in March.

A large tree; occurs in gravel, loam, and other soils; wood used commercially; easily transplanted; much cultivated.

Observations: White-tailed deer.

Ulmus americana L. **American elm.**
Range: 15, 16, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Samara, available March–May.

A large tree; root system very shallow; rapid growing, long-lived; much subject to defoliating insects and borers; not wind-firm; comparatively fire resistant; wood of this species is the most important commercially of the elms; 53,000–100,000 seeds per pound, germination as much as 95 percent; much cultivated; resistant to drought; grows on coal-stripped lands in Illinois.

Stomach records: Ruffed grouse, bobwhite, Hungarian partridge; opossum. *Observations:* Five species of birds including Hungarian partridge, pinnated grouse; cottontail rabbit, snowshoe hare; heavily browsed by white-tailed deer.

Ulmus crassifolia Nutt. **Cedar elm.**
Range: 17, 20, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Samara, available September–November.

A large shrub or more commonly a large tree; may occur on alluvial soil or dry limestone; a shrub in dry situations; wood used commercially to a limited extent; somewhat cultivated.

Ulmus fulva Michx. **Slippery elm.**
Range: 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Samara, available May–June.

A large tree; root system deep and spreading; rapid growing, short-lived; severely injured by defoliating insects; wood durable, used commercially to some extent; 35,000–75,000 seeds per pound.

Observations: Purple finch; porcupine, cottontail rabbit, white-tailed deer.

Ulmus racemosa Thomas. **Rock elm.**
U. thomasii Sarg.
Range: 18, 19, 21, 22, 23, 24, 25, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Samara, available in May.

A large tree; root system deep when mature; slow growing, rather long-lived; severely injured by defoliating insects; wind-firm; fairly free from fungi; easy to transplant; wood used commercially, the most durable of any of the elms.

Observations: Cottontail rabbit.

Ulmus serotina Sarg. **Red elm.**
Range: 25, 27, 29.
Site: Dry, well-drained, sun.
Fruit: Samara, available in November.

A large tree; wood hard, tough; somewhat cultivated; occurs on limestone and other soils; 149,000 seeds per pound.

Ulmus thomasii, see *Ulmus racemosa.*

Umbellularia californica (Hook. and Arn.) Nutt. (pl. 41, *B*). **Oregon myrtle.**
Range: 1, 4, 5, 10.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available in October, somewhat persistent.

A small to large shrub or small to large tree; the typical form is a large tree occurring along streams and valley floors; may be gregarious on north slopes of canyons, forming a very solid cover; dwarf forms, which fruit heavily and form very dense cover, are known to occur in dry chaparral; prostrate forms, occurring on ocean bluffs and hillsides, form low, thick, compact, dense mats; sprouts freely after injury; fruits abundantly produced; wood very valuable commercially.

Stomach records: Steller jay. *Observations:* Much eaten by Columbian gray squirrels. Of slight importance as browse for mule deer. Roots eaten by hogs.

Ungnadia speciosa Endl. **Spanish buckeye.**
Range: 11, 16, 17, 20, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Capsule; available August–October, persistent unopened for a considerable period.

A large shrub or rarely a small to large tree; occurs on limestone and other soils; not resistant to extremely hot weather; occasionally cultivated. Probably has caused some livestock poisoning, but not commonly taken by livestock except in time of food scarcity. Seeds poisonous to human beings. A source of early honey.

Urvillea mexicana, see *Urvillea ulmacea.*

Urvillea ulmacea H. B. K.
U. mexicana Gray.
Range: 17.
Site: Well-drained, sun.
Fruit: Samara.

A large vine

Uva-ursi, see *Arctostaphylos.*

Vaccinium spp. **Blueberries, huckleberries.**

With one exception, none of these species can be grown on soil containing calcium even in small quantities; all occur naturally on acid soils.

Stomach records (in addition to specific records): Eighty-seven species of birds, including ruffed grouse, sharp-tailed grouse, dusky grouse, southern white-tailed ptarmigan, Richardson's grouse; composed 2.4 percent of fall food of prairie chicken in Wisconsin; composed 7.6 percent of winter food of northern sharp-tailed grouse in Ontario and Quebec; Coeur d'Alene chipmunk, red fox, plains white-tailed deer, opossum, white-tailed deer; composed 0.56 percent of fruit food of eastern skunk in Michigan. *Observations* (in addition to specific records): Thirty-five species of birds including ruffed, and spruce grouse, ptarmigan, an important food of ring-necked pheasant; ranked with *Gaylussacia* as twenty-ninth on the list of quail food plants of the Southeast; emergency food of prairie sharp-tailed grouse, Hungarian partridge; southern white-tailed deer, ptarmigan; skunk; much browsed by moose; much eaten by red fox; rarely eaten by coyote; relished by Olympic wapiti, Columbian black-tailed deer, Douglas squirrel, Allen's chipmunk, Pacific mountain beaver, Oregon gray fox, California skunk, Olympic black bear, Virginia opossum; heavily browsed by Rocky Mountain snowshoe rabbit; lesser Colorado chipmunk, Virginia opossum; heavily browsed by white-tailed deer, cottontail rabbit; much eaten by raccoon; alpine chipmunk, ring-tailed cat.

Vaccinium amoenum, see *Vaccinium corymbosum*.

Vaccinium angustifolium Ait. **Lowbush blueberry.**
V. dobbinii Burn., *V. nigrum* Britt., *V. pennsylvanicum* Lam., not Miller, *Cyanococcus pennsylvanicus* (Lam.) Rydb., *C. angustifolius* (Ait.) Rydb.
Range: 22, 23, 24, 26, 27.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available July–September.

A small shrub, flowers April–June; occurs in sandy and other soils; spreads by underground stems; commonly the earliest ripening blueberry.

Stomach records: Six species of birds, including ruffed grouse, bobwhite, and greater prairie chicken. *Observations:* Ruffed grouse, bobwhite. Without forage significance for livestock.

Vaccinium arboreum Marsh. **Tree huckleberry.**
Batodendron arboreum (Marsh.) Nutt.
Range: 17, 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available, September–November.

A large shrub to small or large tree; evergreen southward; flowers May–August; occurs in sandy and other soils; the only species of the genus and one of the two in the heath family supposedly capable of growing in neutral or slightly alkaline soil.

Stomach records: Bobwhite. *Observations:* Mockingbird.

Vaccinium atrococcum (Gray) Heller. **Black blueberry.**
V. corymbosum atrococcum Gray, *Cyanococcus atrococcus* (Gray) Small.
Range: 24, 26, 27, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available July–August.

A small to large, spreading shrub; flowers May–June.

Vaccinium brachycerum, see *Gaylussacia brachycera*.

Vaccinium caesariense Mack. **New Jersey blueberry.**
Range: 28.
Site: Well-drained, moist, sun.
Fruit: Berry.

A small to large shrub; flowers in May.

Vaccinium caesium Greene.
Polycodium caesium Greene, *P. floridanum* (Nutt.) Greene.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Berry.

A small, irregularly branched shrub.

Vaccinium caespitosum Michx. **Dwarf bilberry.**
Range: 4, 7, 12, 13, 23, 24, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Berry, available June–September.

A small shrub: flowers June–July. Without value as forage for livestock.

Vaccinium canadense Kalm. Canada blueberry.
Range: 22, 23, 24, 26, 27.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available July–September.

A small, much-branched shrub; flowers May–June.

Stomach records: Ruffed grouse, sharp-tailed grouse. Of mediocre forage value for livestock.

Vaccinium corymbosum L. Highbush blueberry.
V. amoenum Ait., *Cyanococcus amoenus* (Ait.) Small, *C. corymbosus* (L.) Rydb.
Range: 22, 23, 24, 26, 27, 28, 29.
Site: Dry (rare), well-drained (rare), moist, sun, shade.
Fruit: Berry, available June–August.

A small to large shrub; flowers May–June; suckers freely and transplants well; fruit of value commercially.

Var. *pallidum* (Ait.) Gray, (*V. pallidum* Ait., *Cyanococcus pallidus* (Ait.) Small), has superior fruit.

Observations: Mourning dove, ruffed grouse, ring-necked pheasant; cottontail rabbit.

Vaccinium crassifolium Andr. Creeping blueberry.
Herpothamnus crassifolius (Andr.) Small.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Berry.

A small evergreen shrub; possibly maintains itself mainly by vegetative reproduction.

Vaccinium deliciosum Piper.
Range: 1, 4.
Site: Well-drained, sun.
Fruit: Berry.

A small shrub.

Vaccinium dobbinii, see *Vaccinium angustifolium.*

Vaccinium dumosum, see *Gaylussacia dumosa.*

Vaccinium elliotti Chapm. Elliott blueberry
Cyanococcus elliottii (Chapm.) Small.
Range: 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Berry, available May–June.

A small to large shrub; flowers March–May.

Vaccinium erythrocarpum, see *Hugeria erythrocarpa.*

Vaccinium erythrococcum, see *Vaccinium scoparium.*

Vaccinium frondosum, see *Gaylussacia frondosa.*

Vaccinium globulare, see *Vaccinium membranaceum.*

Vaccinium hirsutum Buckl. Hairy huckleberry.
Cyanococcus hirsutus (Buckl.) Small.
Range: 27.
Site: Well-drained, sun.
Fruit: Berry, available in August.

A small shrub; flowers May–June; fruit hairy.

Vaccinium hispidulum, see *Chiogenes hispidula.*

Vaccinium humifusum, see *Gaultheria humifusa.*

Vaccinium macrocarpon Ait. Cranberry.
Oxycoccus macrocarpus (Ait.) Pursh.
Range: 22, 23, 24, 25, 26, 27.
Site: Well-drained, moist, sun.
Fruit: Berry, available August–March.

A creeping, evergreen, mat-forming vine; flowers June–August; this species includes varieties furnishing the commercial cranberry; 500 berries per pound, about 25 seeds per berry.

Stomach records: Six species of birds, including ruffed grouse.

Observations: Crow, mourning dove, bobwhite, prairie sharp-tailed grouse.

Vaccinium macrophyllum, see *Vaccinium membranaceum.*

Vaccinium melanocarpum Mohr. **Southern gooseberry.**
Polycodium melanocarpum (Mohr) Small.
Range: 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available in July.

A small shrub; occurs in sandy and other soils; fruit commonly produced in great quantities.

Vaccinium membranaceum Dougl. **Thinleaf huckleberry.**
V. globulare Rydb., *V. macrophyllum* Piper, *V. myrtilloides* Hook.
Range: 1, 4, 12, 13, 15 (Black Hills), 23, 24.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available July–September.

A small shrub; flowers June–July. Poor to worthless to fairly good or good browse for sheep; poor to worthless forage for cattle and horses.

Vaccinium microphyllum, see *Vaccinium scoparium.*

Vaccinium myrsinites Lam. **Evergreen blueberry.**
Cyanococcus myrsinites (Lam.) Small.
Range: 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Berry, available in May.

A small evergreen shrub; flowers April–May decumbent or upright; occurs in sandy and other soils. Var. *glaucum* Gray, in the southern part of the range, is taller than the species.

Vaccinium myrtilloides, see *Vaccinium membranaceum.*

Vaccinium neglectum (Small) Fern.
Polycodium neglectum Small.
Range: 22, 25, 28, 29, 30.
Site: Dry, sun.
Fruit: Berry.

A small shrub with inedible fruit.

Vaccinium nigrum, see *Vaccinium angustifolium.*

Vaccinium occidentale Gray. **Western huckleberry.**
Range: 4, 12, 13.
Site: Well-drained, moist, sun.
Fruit: Berry, available July–August.

A small shrub.

Stomach records: Sooty grouse. *Observations:* Blue grouse. Fair to fairly good sheep and goat feed; cropped locally by cattle.

Vaccinium oreophilum Rydb. **Rocky Mountain whortleberry.**
Range: 12, 13, 14.
Site: Well-drained, sun.
Fruit: Berry, available July–October.

A small shrub; flowers in June.

Stomach records: Richardson's grouse. Worthless as forage for cattle; sometimes fair sheep feed.

Vaccinium ovalifolium Smith. **Blue whortleberry.**
Range: 2, 4, 12, 23, 24.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available July–August.

A large, straggling shrub; flowers June–July. Locally useful as browse for sheep and goats.

Observations: Spruce grouse.

Vaccinium ovatum Pursh. **Evergreen huckleberry.**
Range: 1, 2, 5.
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available July–September, or rarely longer.

A small to large evergreen shrub; most commonly occurs in sandy soil; forms a dense cover when growing close together.

Var. *saporosum* Jeps., in region 1, has fruit which ripens earlier with a better flavor.

Stomach records: Ruffed grouse (?). *Observations:* Listed with *V. parvifolium* as second in importance as browse for Olympic wapiti in Washington; California mule deer; an important food of Roosevelt elk.

Vaccinium oxycoccus L. **Small cranberry.**
Oxycoccus palustris Pers., *O. oxycoccus* (L.) MacBr.
Range: 23, 24, 26, 27.
Site: Moist, sun.
Fruit: Berry, available August–September, often persistent.
A low, creeping, evergeen vine, occurring only in peat; flowers May–July.
Var. *intermedium* Gray occurs in regions 1, 2, and 12.
Stomach records: Coeur d'Alene chipmunk. *Observations:* Prairie sharp-tailed grouse, ring-necked pheasant.

Vaccinium pallidum, see *Vaccinium corymbosum.*

Vaccinium parvifolium Smith. (pl. 41, *C*). **Tall red huckleberry.**
Range: 1, 2, 4, 12.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available June–September.
A small to large shrub.
Observations: Sooty grouse; listed with *V. ovatum* as second in importance as browse for Olympic wapiti in Washington; an important food of Roosevelt elk. Locally of value as browse for sheep and occasionally cattle.

Vaccinium pennsylvanicum, see *Vaccinium angustifolium.*

Vaccinium scoparium Leiberg. **Grouseberry.**
V. erythrococcum Rydb., *V. microphyllum* Rydb.
Range: 4, 12, 13, 14, 15 (Black Hills).
Site: Dry, well-drained, moist, shade.
Fruit: Berry, available July–September.
A small shrub.
Observations: An important food of wildlife. Inferior browse for livestock.

Vaccinium simulatum Small.
Cyanococcus simulatus Small.
Range: 27.
Site: Well-drained, sun.
Fruit: Berry.
A small to large shrub.

Vaccinium stamineum L. **Deerberry.**
Polycodium stamineum (L.) Greene.
Range: 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Berry; available July–September, soon dropping.
A small, profusely-branched shrub; somewhat thicket forming.
Stomach records: Ruffed grouse; gray fox. *Observations:* Eight species of birds, including bobwhite and ruffed grouse; white-tailed deer.

Vaccinium tenellum, see *Vaccinium virgatum.*

Vaccinium uliginosum L. **Bog bilberry.**
Range: 1, 4, 12, 13, 14, 23, 24, 26, 27.
Site: Dry, well-drained, sun.
Fruit: Berry, available July–September.
A small shrub; flowers June–July.
Stomach records: Spruce grouse, ptarmigan, Harris' sparrow; mountain sheep. *Observations:* Three species of birds.

Vaccinium vacillans Kalm. **Dryland blueberry.**
Cyanococcus vacillans (Kalm.) Rydb.
Range: 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available July–September.
A small, loosely-branched shrub; flowers May–June; occurs in sandy and other soils.
Stomach records: Gray fox. *Observations:* Ruffed grouse; preferred food of wild turkey; cottontail rabbit, white-tailed deer.

Vaccinium virgatum Ait. **Rabbiteye blueberry.**
Cyanococcus virgatus (Ait.) Small.
Range: 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available July–August.

A small to large shrub; flowers April–May.

Var. *tenellum* (Ait.) Gray, (*V. tenellum* Ait., *Cyanococcus tenellus* (Ait.) Small), possesses underground stems, and occurs in regions 25, 27, and 29.

Stomach records: Cardinal.

Vaccinium vitis-idaea L. **Cowberry.**
Vitis-idaea vitis-idaea (L.) Britt., *Vitis-idaea punctata* Moench.
Range: 23, 26.
Site: Dry, well-drained, sun.
Fruit: Berry, available August–October.

A small shrub or mat-forming vine; evergreen; flowers June–July; reproduces by creeping rootstocks.

Var. *minus* Lodd., a dwarf variety, is claimed by some to be the only representative of the species in the United States.

Vachellia farnesiana, see *Acacia farnesiana.*

Vauquelinia angustifolia Rydb.
Range: 11.
Site: Dry, sun.
Fruit: Capsule.

A large shrub to small tree; evergreen.

Vauquelinia californica (Torr.) Sarg. **Vauquelinia.**
V. corymbosa Corr., *V. torreyi* Wats., *Spiraea californica* Torr.
Range: 5, 10, 11.
Site: Dry, well-drained, sun.
Fruit: Capsule, available in August.

A large shrub to small tree; evergreen; flowers in June.

Vauquelinia corymbosa, see *Vauquelinia californica.*

Vauquelinia torreyi, see *Vauquelinia californica.*

Viborquia polystachya, see *Eysenhardtia polystachya.*

Viburnum spp. **Viburnums.**

Most species occur on nearly neutral soil; most are free from insects and disease; propagation is by seed stratified and sown in spring or by soft or hardwood cuttings, cut below the node, and if propagated in sand and peat, treated with potassium permanganate.

Stomach records (in addition to specific records): Twenty-seven species of birds, including ruffed grouse, sharp-tailed grouse, and greater prairie chicken; coyote; white-tailed deer. *Observations* (in addition to specific records): Ten species of birds, including bobwhite and ruffed grouse; porcupine; eastern chipmunk. Of comparatively little value as browse for livestock.

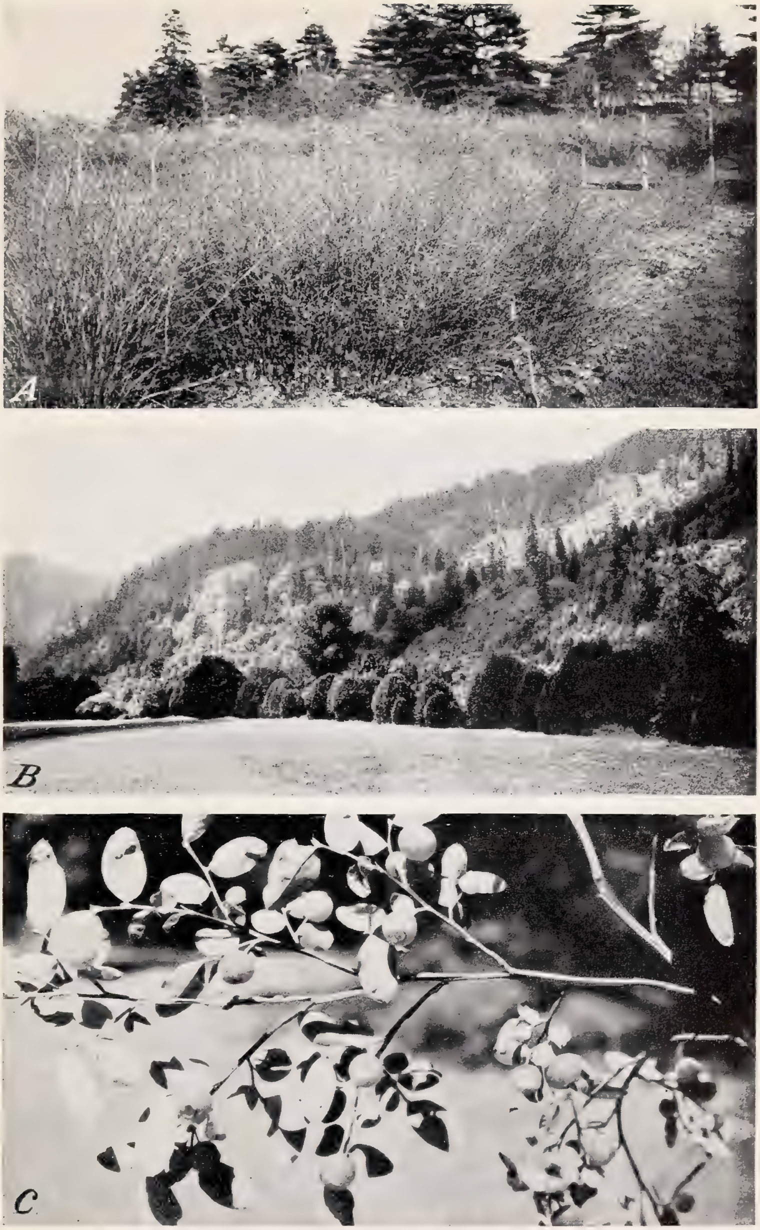
Viburnum acerifolium L. **Mapleleaf viburnum.**
Range: 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe; available September–October, often persistent until July.

A small shrub; flowers May–June; slow growing; endures city smoke; occasionally thicket forming; about 4,500 fresh berries per pound.

Stomach records: Four species of birds, including ruffed grouse; white-tailed deer. *Observations:* Sparingly eaten by cottontail rabbit.

Viburnum affine Bush. **Missouri viburnum.**
V. pubescens affine Rehd.
Range: 22, 25.
Site: Dry, well-drained, moist (rare), sun, shade.
Fruit: Drupe, available August–September.

A small shrub; flowers May–June. Var. *hypomalucum* Blake extends the range to regions 23, 24, 26, 27, and 28, and is more floriferous.



A, Symphoricarpos albus. The dense thickets formed by the snowberry, coupled with its ability to grow on poor sites, make it a valuable plant in erosion control. *B, Umbellularia californica.* Oregon myrtle, shown here growing along a stream in the northern part of its range, may find a place in stream-bank plantings. Its value as wildlife cover is great; its value as food is possibly greater than actual records would indicate. *C, Vaccinium parvifolium.* The juicy, red fruit of this species is probably of great value for wildlife despite the paucity of actual stomach records.

Viburnum alnifolium. A species of possible use in woodland border planting. Its wildlife values are probably greater than recorded data indicate.

Viburnum alnifolium Marsh. (pl. 42). **Hobblebush.**
Range: 23, 24, 26, 27.
Site: Well-drained, moist, shade.
Fruit: Drupe, available August–September.

A small to large shrub; flowers May–June; commonly occurs in acid soils; thicket forming; reclining branches often root at the nodes or at the tip.

Stomach records: Ruffed grouse. *Observations:* Cottontail rabbit; preferred food of white-tailed deer in New York.

Viburnum americanum, see *Viburnum trilobum.*

Viburnum bracteatum Rehd.
Range: 27.
Site: Well-drained, sun.
Fruit: Drupe.

A large shrub.

Viburnum cassinoides L. **Withe rod.**
Range: 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe, available September–October, falling at once.

A small or more commonly a large shrub; flowers June–July; occasionally thicket forming; 3,000 dry berries per pound.

Stomach records: Ruffed grouse, sharp-tailed grouse, ring-necked pheasant. *Observations:* Hungarian partridge; an important food of white-tailed deer; cottontail rabbit.

Viburnum densiflorum Chapm.
Range: 30.
Site: Well-drained, sun.
Fruit: Drupe.

A small shrub; flowers April–May.

Viburnum dentatum L. **Arrowwood.**
Range: 22, 23, 24, 25, 26, 27.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe, available October–December.

A large shrub; flowers May–June; thicket forming; endures city smoke; easily propagated by cuttings; 17,900 seeds per pound.

Stomach records: Seven species of birds, including ruffed grouse. *Observations:* Three species of birds; eastern chipmunk.

Viburnum ellipticum Hook. **Western blackhaw.**
Range: 1, 4.
Site: Dry, well-drained, moist, sun.
Fruit: Drupe, available July–September.

A small to large shrub; flowers April–June.

Stomach records: Magpie.

Viburnum ferrugineum, see *Viburnum rufidulum.*

Viburnum lentago L. **Nannyberry.**
Range: 13, 15 (Black Hills), 18, 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe; available August–September, commonly persistent.

Usually a large shrub, more rarely a small or large tree; multiplies freely by suckers; will endure city smoke; easily propagated by cuttings; 3,000–5,000 berries per pound, 4,300 seeds per pound.

Stomach records: Four species of birds, including ruffed grouse. *Observations:* Ten species of birds, including ring-necked pheasant; much eaten by ruffed grouse; much eaten by raccoon; skunk, cottontail rabbit; gray squirrel. Fruit eaten to some extent by sheep and goats.

Viburnum molle Michx. **Soft arrowwood.**
Range: 22, 25, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe, available September–October.

A large shrub; flowers in June; commonly occurs in calcareous soil.

Stomach records: Two species of birds.

Viburnum nitidum Ait. **Shining withe rod.**
V. nudum angustifolium Torr. and Gray.
Range: 28, 29.
Site: Moist, sun, shade.
Fruit: Drupe, available September–October.
A large shrub with reclining branches.

Viburnum nudum L. **Possumhaw.**
Range: 20, 25, 27, 28, 29, 30.
Site: Moist, sun, shade.
Fruit: Drupe, available September–March.
Usually a large shrub or rarely a small tree; flowers May–June or occasionally in autumn.
Stomach records: Bobwhite.

Viburnum obovatum Walt. **Small viburnum.**
Range: 29, 30.
Site: Moist, sun, shade.
Fruit: Drupe.
A large shrub to small tree.

Viburnum opulus, see *Viburnum trilobum.*

Viburnum pauciflorum Raf. **Squashberry.**
Range: 4, 12, 13, 23, 24, 26, 27.
Site: Moist, sun, shade.
Fruit: Drupe, available July–September, more or less persistent.
A small to large, straggling shrub; flowers June–July.
Stomach records: Three species of birds, including ruffed grouse. *Observations:* Moose, red squirrel. Foliage of low palatability to livestock.

Viburnum prunifolium L. **Blackhaw.**
Range: 20, 22, 23, 24, 25, 27, 28, 29, 30.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Drupe, available August–March.
Usually a small or large shrub or rarely a small tree; flowers April–June; 4,200 seeds per pound.
Stomach records: Eight species of birds including bobwhite; gray fox, white-tailed deer. *Observations:* Three species of birds.

Viburnum pubescens (Ait.) Pursh. **Hairy nannyberry.**
V. dentatum pubescens Ait., *V. rafinesquianum* Schult.
Range: 15, 21, 22, 24, 25, 27.
Site: Dry, well-drained, sun, shade.
Fruit: Drupe, available August–October.
A small, straggling shrub; flowers June–July; commonly occurs on calcareous soil.
Stomach records: Thrush.

Viburnum rafinesquianum, see *Viburnum pubescens.*

Viburnum rufidulum Raf. **Southern blackhaw.**
V. ferrugineum Small, *V. rufotomentosum* Small.
Range: 17, 19, 20, 25, 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Drupe; available October–November, often persistent until March.
A large shrub to small tree; flowers April–May; slow-growing, long-lived; occurs in sand, loam, and other soils.

Viburnum rufotomentosum, see *Viburnum rufidulum.*

Viburnum scabrellum (Torr. and Gray) Chapm. **Rough arrowwood.**
V. dentatum semitomentosum Michx., *V. semitomentosum* (Michx.) Rehd.
Range: 27, 28, 29, 30.
Site: Well-drained, moist.
Fruit: Drupe; available September–October.
A small to large shrub; flowers in June. Very similar to *V. dentatum.*

Viburnum semitomentosum, see *Viburnum scabrellum.*

Viburnum trilobum Marsh. (pl. 43). **Highbush cranberry.**
V. opulus americanum of amer. auths., not Mill.
Range: 4, 12, 15 (Black Hills), 18, 21, 22, 23, 24, 26, 27.
Site: Well-drained, moist, sun, shade.
Fruit: Drupe; available September–October, often persistent until May.

A large shrub; flowers June–July; 16,000 seeds per pound.

Stomach records: Three species of birds, including ruffed grouse and sharp-tailed grouse. *Observations:* Six species of birds, including Canada ruffed grouse and ring-necked pheasant. Without significance as browse for livestock.

Viburnum venosum Britt. **Veiny viburnum.**
V. venosum canbyi Rehd.
Range: 27.
Site: Dry, sun.
Fruit: Drupe.

Usually a small shrub, rarely a large shrub; flowers June–July.

Viguiera deltoidea Gray.
Range: 5, 9, 10.
Site: Dry, sun.
Fruit: Achene.

A small, much-branched shrub represented in the United States by var. *parishii* (Greene). Browse value for livestock limited.

Viguiera parishii, see *Viguiera deltoidea.*

Viguiera reticulata Wats.
Range: 10.
Site: Dry, sun.
Fruit: Achene.

A small, loosely branched shrub with limited browse value for livestock.

Viguiera stenoloba Blake.
Gymnolomia tenuifolia Benth. and Hook., *Heliomeris tenuifolia* Gray.
Range: 11, 16, 17.
Site: Dry, sun.
Fruit: Achene.

A small, much-branched shrub with limited value as browse for livestock.

Viorna addisonii, see *Clematis addisonii.*

Viorna arizonica, see *Clematis arizonica.*

Viorna bigelovii, see *Clematis bigelovii.*

Viorna coccinea, see *Clematis texensis.*

Viorna crispa, see *Clematis crispa.*

Viorna filifera, see *Clematis pitcheri.*

Viorna gattingeri, see *Clematis gattingeri.*

Viorna obliqua, see *Clematis obliqua.*

Viorna pitcheri, see *Clematis pitcheri.*

Viorna reticulata, see *Clematis reticulata.*

Viorna versicolor, see *Clematis versicolor.*

Viorna viorna, see *Clematis viorna.*

Vitis spp. **Grapes.**

The species vary greatly in many characters including resistance to disease; species native to high arid regions where the air is too dry to permit growth of mildews and rots are attacked quickly when transplanted to low, moist climates; species growing in *Phylloxera*-free regions are usually much attacked when transplanted to regions infested with the pest; the species are nearly dioecious, but staminate flowers are often borne on pistillate vines; propagated by stratified seed or soft or hardwood cuttings.

Stomach records (in addition to specific records): Eighty-two species of birds, including ruffed grouse, sharp-tailed grouse, bobwhite, California quail, wild turkey, ring-necked pheasant, and mourning dove; western skunk, striped skunk, gray fox, red squirrel, raccoon, eastern skunk, opossum; composed 2.36

percent of fruit food of eastern skunk in Michigan. *Observations* (in addition to specific records): Forty-five species of birds, including Gambel quail, band-tailed pigeon, ruffed grouse; ranks seventeenth on the list of quail food plants of the Southeast; ring-necked pheasant, Hungarian partridge, pinnated grouse; heavily browsed by white-tailed deer; important food of raccoon, gray fox, red fox, coyote, cottontail rabbit, skunk, rock squirrel.

Vitis acerifolia, see *Vitis longii.*

Vitis aestivalis Michx. **Summer grape.**

Range: 22, 23, 24, 25, 27, 28, 29.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available August–September, often persistent.

A vigorous, high-climbing vine; flowers May–June; grows on sand, clay, loam, and other soils, but does best on warm, gravelly, well-drained ones; roots large, hard, penetrating; fairly resistant to cold and drought; resistant to mildew and rot, about 75 percent to *Phylloxera;* has given rise to numerous cultivated forms; about 50 percent of cuttings root.

Stomach records: Eight species of birds, including ruffed grouse and bob-white. *Observations:* Cardinal, cowbird; a greatly preferred food of wild turkey; white-tailed deer.

Vitis andersonii, see *Vitis vulpina.*

Vitis argentifolia Muns. **Blueleaf grape.**

V. aestivalis bicolor Deam, *V. bicolor* LeConte, *V. caerulea* Munson, *V. lecontiana* House.

Range: 22, 23, 24, 25, 26, 27, 28.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry, available September–October, often persistent.

A vigorous, high-climbing vine; flowers May–June; resistant to very low temperatures; somewhat attacked by mildew; grows in sand, sandy clay, and other soils; resistant to cold and drought; roots hard, fibrous, large; about 40 percent of cuttings root although propagation by cuttings is often difficult; fruit borne prolifically.

Stomach records: Ruffed grouse.

Vitis arizonica Engelm. **Canyon grape.**

Range: 9, 10, 11, 16, 17.
Site: Well-drained, moist, sun.
Fruit: Berry; available July–August, often persistent until October.

A weak, much-branched vine or small to large shrub with abortive tendrils; scarcely climbing; endures cold and drought well; where grown with excessive moisture commonly attacked by mildew and rots; grows better in sandy than heavy soils; easily grown from cuttings; apparently formerly cultivated by the Pueblo Indians.

Observations: Eaten by numerous birds including Gambel, scaled, and Mearns quail; prized food of skunks, foxes, coyotes, bears; much eaten by captive deer.

Vitis austrina, see *Vitis simpsonii.*

Vitis baileyana Muns. **Possum grape.**

V. virginiana Muns., not Poir.

Range: 25, 27, 28, 29.
Site: Well-drained, sun.
Fruit: Berry, available August–September.

A slender, climbing, much-branched vine; roots fleshy, sparingly branched, not deep-penetrating; fairly resistant to *Phylloxera;* commonly occurs on calcerous soils.

Vitis berlandieri Planch. **Winter grape.**

Range: 11, 17, 20, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Berry, available August–October.

A stocky vine; high climbing in favorable situations; commonly occurs on limestone soils; roots hard, little-branched, penetrating deeply; resistant to black rot and *Phylloxera;* susceptible to mildew; long-lived; will endure cold and drought; commonly occurs on calcareous soil; seed germination slow; about 40 percent of cuttings root.

Vitis bicolor, see *Vitis argentifolia.*

Vitis boulderensis, see *Vitis vulpina.*

Viburnum trilobum. Highbush cranberry ranks high for erosion-control and wildlife plantings. Its ornamental character recommends its use on highway cuts.

Yucca elata. Yuccas appear to have little value either for wildlife or soil conservation. More information on their possible usefulness is needed.

Vitis caerulea, see *Vitis argentifolia.*

Vitis californica Benth. **California grape.**
Range: 1, 2, 3, 4, 10, 11.
Site: Well-drained, moist, sun.
Fruit: Berry, available July–August, commonly persistent.

A vigorous, high-climbing or trailing vine, or frequently a shrub; roots soft; very susceptible to downy mildew; more or less resistant to *Phylloxera;* very resistant to fire.

Stomach records: Robin, valley quail. *Observations:* Mountain quail.

Vitis candicans Engelm. **Mustang grape.**
Range: 11, 16, 17, 20, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Berry; available June–August, often persistent until well into winter.

A vigorous, climbing vine; roots vigorous, tender, penetrating more deeply than any other species of grape; endures great drought and heat; free from disease; long-lived; foliage thick; difficult to grow from cuttings; about 75 percent resistant to *Phylloxera*; commonly occurs on limestone soil although thriving in nearly any soil; seedlings at first feeble, later very vigorous.

Var. *coriacea* Bailey has smaller and more edible fruit and occurs within the range of the species.

Vitis caribaea, see *Vitis sola.*

Vitis champinii Planch. **Champin grape.**
Range: 11, 16, 17, 20, 25.
Site: Dry, well-drained, sun.
Fruit: Berry; available June–August, commonly persistent.

A robust, climbing vine; roots deep-penetrating, large, much-branched; often occurs on limestone soil but will grow on a variety of soils; about 60-percent resistant to *Phylloxera*; resistant to Anaheim disease; resistant to cold and drought; staminate vines commonly fewer in its native habitats than the pistillate ones; 80 percent of cuttings root; often forms dense thickets. Has been considered a possible hybrid between *V. rupestris* or *V. berlandieri,* and *V. candicans.*

Vitis cinerea Engelm. **Sweet winter grape.**
Range: 11, 17, 20, 22, 23, 25, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Berry; available August–November, long persistent.

A vigorous, high-climbing vine; flowers May–June; commonly occurs on deep, rich, riverbank soils; roots large, fleshy, deep-penetrating, scarcely fibrous; very long-lived, resistant to great extremes of drought and moisture; free from disease; 75 percent resistant to *Phylloxera;* resistant to cold; about 25 percent of cuttings root; often difficult to reproduce by cuttings.

Vitis cordifolia Michx. **Frost grape.**
Range: 17, 20, 22, 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Berry, available August–October, often persistent.

A large, vigorous, high climbing vine; flowers May–June; roots strong, hard, fairly deep-penetrating; nearly completely resistant to *Phylloxera;* resistant to mildew, rot, and drought; very resistant to cold; cuttings grow with difficulty, approximately 25 percent being successful; occurs on calcareous, sandy, and other soils. Var. *sempervirens* Muns., occurring within the range of the species, has more persistent foliage, is more sensitive to cold, and has fruit which ripens later than that of the species.

Stomach records: Twenty-eight species of birds, including ruffed grouse, bobwhite, and wild turkey. *Observations:* Cardinal, gray-cheeked thrush.

Vitis doaniana Muns. **Doan grape.**
Range: 16, 19, 20.
Site: Well-drained, sun.
Fruit: Berry, available July–October, persistent.

A rapid-growing, vigorous vine, remaining bushy if failing to find support; commonly occurs on sandy, calcareous soils; roots fibrous, hard, spreading, and penetrating; resistant to drought, cold, and disease; 60 percent resistant to *Phylloxera;* 60 percent of cuttings take.

Vitis girdiana Muns. **Valley grape.**
Range: 5, 10.
Site: Dry (rare), well-drained, moist, sun.
Fruit: Berry, available August–September, persistent.

A robust, high-climbing vine; roots soft, not completely resistant to *Phylloxera;* sensitive to cold; subject to mildew, rot, and Anaheim disease; often occurs on sandy soil.

Vitis helleri (Bailey) Small. **Roundleaf grape.**
V. cordifolia helleri Bailey.
Range: 17, 20.
Site: Well-drained, sun.
Fruit: Berry, available in July.

A vine.

Vitis incisa, see *Cissus incisa.*

Vitis labrusca L. **Fox grape.**
Range: 22, 23, 24, 25, 26, 27.
Site: Dry, well-drained, moist, sun, shade.
Fruit: Berry; available August–October, dropping at once.

A vigorous, high-climbing, bushy vine; roots large and fleshy, spreading, not deeply penetrating; growth of 1-year-old plants feeble, vigorous when established; does best in well-drained, alluvial soil but occurs in many, including sand; withstands cold well, heat and drought rather poorly; not affected by downy mildew; berries falling singly when ripe; easily grown from cuttings; susceptible to *Phylloxera;* seeds rarely produce plants true to type.

Stomach records: Six species of birds, including ruffed grouse and ring-necked pheasant. *Observations:* Much eaten by skunk, fox, raccoon, and opossum.

Vitis lecontiana, see *Vitis argentifolia.*

Vitis lincecumii Buckl. **Pinewoods grape.**
Range: 20, 25, 29.
Site: Dry, well-drained, sun, shade.
Fruit: Berry; available June–September, falling at once or persistent.

A vigorous, moderately-climbing vine, or a shrub if without support; occurs in sand, clay, loam, and other soils; roots, long, hard, fleshy, penetrating deeply; fairly resistant to cold; extremely resistant to drought; susceptible to mildew and rot; 75-percent resistant to *Phylloxera;* about 50 percent of cuttings take; reproduction by cuttings often difficult; fruit-bearing vines generally do not self-fertilize; seed germination prompt. Fruit often eaten by domestic turkeys before ripening.

Vitis longii Prince. **Long's grape.**
V. acerifolia Raf., *V. nova-mexicana* Muns., *V. solonis* Hort.
Range: 11, 16, 17, 19, 20, 25.
Site: Dry, well-drained, sun.
Fruit: Berry, available July–August, long persistent.

A vine or more commonly a small to large, stocky, erect, much-branched shrub; climbs vigorously in cultivation; roots large, much-branched, hard, deep-penetrating; occurs in sand and calcareous soils; drought and cold-resistant; about 75-percent resistant to *Phylloxera;* not resistant to mildew or anthracnose; 60 percent of cuttings root; self-pollination rare.

Var. *microsperma* Bailey, a vigorous, small-seeded form very resistant to drought, occurs along the Red River in Texas.

Vitis montana, see *Vitis monticola.*

Vitis monticola Buckl. **Sweet mountain grape.**
V. montana of Auths. not Buckl.
Range: 11, 17, 20.
Site: Dry, well-drained, sun.
Fruit: Berry, available August–October.

A slender, small-leaved vine with open foliage; roots little-branched; resistant to cold, drought, mildew, rot and nearly completely resistant to *Phylloxera;* slender when wild, stocky in cultivation; commonly occurs on limestone soils, but grows moderately well on sand; 65 percent of cuttings root.

Vitis munsoniana Simpson. **Little muscadine grape.**
Muscadinia munsoniana Small.
Range: 30, 31.
Site: Dry, well-drained, sun, shade.
Fruit: Berry, available August–November.
A slender, trailing vine; blooms nearly continuously; usually not high-climbing.

Vitis muscadina, see *Vitis rotundifolia.*

Vitis nova-mexicana, see *Vitis longii.*

Vitis novae-angliae Fern. **Pilgrim grape.**
Range: 26, 27.
Site: Well-drained, sun.
Fruit: Berry, available in September.
A vigorous, climbing vine; often forms thickets of great profusion.

Vitis palmata Vahl. **Cat grape.**
V. rubra Michx.
Range: 22, 25, 29.
Site: Well-drained, sun.
Fruit: Berry, available September–October, persistent.
A slender, high-climbing vine; flowers May–June; roots fibrous at the surface, hard and penetrating; resistant to drought and cold when established; resistant to *Phylloxera;* free from disease; seed germination very slow.

Vitis riparia, see *Vitis vulpina.*

Vitis rotundifolia Michx. **Muscadine grape.**
V. muscadina Raf., *Muscadinia rotundifolia* (Michx.) Small.
Range: 20, 22, 25, 28, 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Berry, available August–September.
A very vigorous, high-climbing vine; flowers in May; occurs in sandy and other soils; roots thick, little-branched; berries drop singly as soon as ripe; free from diseases; cuttings root with difficulty, but layers of wood twisted withelike at one point when covered root easily; the original of the Scuppernong grape.
Stomach records: Cardinal, bobwhite; opossum. *Observations:* Cardinal.

Vitis rubra, see *Vitis palmata.*

Vitis rufotomentosa Small. **Redshank grape.**
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Berry, available August–September.
A strong, high-climbing vine.

Vitis rupestris Scheele. **Sand grape.**
Range: 11, 16, 17, 20, 25, 27, 28, 29.
Site: Well-drained, sun.
Fruit: Berry, available July–August.
A vigorous, much-branched vine, or more commonly a low, bushy shrub; occasionally prostrate and trailing; succeeds in poor, calcareous and sandy soils; roots slender, long; almost entirely resistant to *Phylloxera;* more or less resistant to drought; resistant to cold; not resistant to anthracnose; resistant to other diseases and insects; easily propagated by cuttings; 80 percent of cuttings root; pistillate plants rarely produce fruit alone; seed germination rapid.
Observations: Deer. Browsed by cattle and sheep.

Vitis simpsonii Munson. **Currant grape.**
V. cincerea floridana Munson, *V. austrina* Small.
Range: 29, 30 .
Site: Well-drained, sun.
Fruit: Berry, available in August.
A strong, high-climbing vine.

Vitis slavinii, see *Vitis vulpina.*

Vitis sola Bailey. Curtiss grape.
V. caribaca Am. auth., not DC.
Range: 30.
Site: Well-drained, moist, sun.
Fruit: Berry; available August–September, persistent.

A vigorous vine.

Vitis solonis, see *Vitis longii.*

Vitis treleasei Munson. Gulch grape.
Range: 11.
Site: Dry, well-drained, sun.
Fruit: Berry, available September–November.

A vine or shrub; much branched; scarcely climbing; tendrills deciduous the first year unless they find support; seeds small; drought resistant; comparatively susceptible to mildew and rot.

Vitis virginiana, see *Vitis baileyana.*

Vitis vulpina L. Riverbank grape.
V. boulderensis Daniels, *V. riparia* Michx.
Range: 15, 16, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29.
Site: Well-drained, sun.
Fruit: Berry; available June–November, persistent.

A vigorous, moderately-branching and climbing vine; commonly occurs on well-drained, loose, sandy soils; grows poorly in lime or clay soil; roots long, thin, hard, fibrous; almost entirely resistant to *Phylloxera;* very resistant to cold; not resistant to heat and drought; germination of seed quick and vigorous; easily grown from cuttings, 85 percent of cuttings root; easily grafted; commonly used in Europe as grafting stock for *V. vinifera;* 14,500 seeds per pound.

Var. *syrticola* Fern. and Wieg., the dune grape, commonly occurs on sand dunes in region 24 and apparently withstands partial burial in sand. *V. slavinii* Rehd. is a supposed hybrid between *V. vulpina* and *V. argentifolia, V. andersonii* is a supposed hybrid between *V. vulpina* and *V. kaempferi glabrescens,* a Japanese species.

Stomach records: Six species of birds, including ruffed grouse, bobwhite, wild turkey, and mourning dove; composed 4.1 percent of total annual food and 54.3 percent of total fruit food of ring-necked pheasant in Michigan; white-tailed deer. *Observations:* Ring-necked pheasant, cedar waxwing; red fox, skunk, white-tailed deer, cottontail rabbit.

Vitis-idaea punctata, see *Vaccinium vitis-idaea.*

Vitis-idaea vitis-idaea, see *Vaccinium vitis-idaea.*

Washingtonia robusta Wendl. Fan palm.
W. filifera robusta (Wendl.) Parish, *Neowashingtonia robusta* (Wendl.) Heller.
Range: 10.
Site: Well-drained, moist, sun.
Fruit: Berry.

A large evergreen tree; occurs in alkaline soil.

Whipplea modesta Torr. Yerba de selva.
Range: 1, 4.
Site: Moist, sun, shade.
Fruit: Capsule.

A small trailing shrub; flowers April–June; prostrate branches root freely at the nodes.

Whipplea utahensis, see *Fendlerella utahensis.*

Wisteria frutescens (L.) Poir. American wisteria.
W. speciosa Nutt., *Kraunhia frutescens* (L.) Greene.
Range: 17, 20, 22, 25, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Legume, available September–November.

A vine.

Wisteria macrostachya Torr. and Gray. Kentucky wisteria.
Kraunhia macrostachya (Torr. and Gray) Small.
Range: 25, 27, 28, 29, 30.
Site: Well-drained, moist, sun.
Fruit: Legume; available in October, often persistent until March.
A robust and vigorous vine; flowers May–July.

Wisteria speciosa, see *Wisteria frutescens.*

Xanthorhiza apiifolia, see *Xanthorhiza simplicissima.*

Xanthorhiza simplicissima Marsh. Yellowroot.
X. apiifolia L'Her.
Range: 27, 28, 29, 30.
Site: Dry, well-drained, sun.
Fruit: Follicle.
A small creeping and rooting shrub; flowers April–May; free from insects and diseases; may form a dense ground cover.

Xanthoxylum spp.
Observations (in addition to specific records): Extensively used by kingbird.

Xanthoxylum americanum Mill. Northern prickly-ash.
Range: 22, 23, 24, 25, 26, 27, 29, 30.
Site: Dry (rare), well-drained, moist, sun, shade.
Fruit: Follicle.
A large shrub to small tree; flowers April–May; spiny.
Stomach records: Red-eyed vireo, bobwhite. *Observations:* Important food of pheasants in southern Michigan; cottontail rabbit; eastern chipmunk.

Xanthoxylum clava-herculis L. Hercules-club.
Fagara clava-herculis (L.) Small.
Range: 20, 22, 25, 28, 29, 30.
Site: Dry, well-drained, moist, sun.
Fruit: Follicle, available May–June.
A large shrub to small tree; thorny; occurs in sandy or gravelly soils.

Xanthoxylum fagara (L.) Sarg. Wild lime.
X. pterota H. B. K., *Schinus fagara* L., *Fagara pterota* L., *F. fagara* Small.
Range: 11, 17, 32.
Site: Well-drained, sun.
Fruit: Follicle, available March–September.
A large shrub to large tree; evergreen, thorny, and dioecious; shrubby westward.
Observations: Cottontail rabbit.

Xanthoxylum texanum, see *Amyris texana.*

Xerocassia armata, see *Cassia armata.*

Xolisma ferruginea (Walt.) Heller.
Lyonia rigida Nutt.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Capsule.
A large shrub to small tree, or very rarely a large tree; evergreen; widely-branched; occurs in sandy and other soils; flowers February–April.

Xolisma foliosiflora, see *Xolisma ligustrina.*

Xolisma fruticosa (Michx.) Nash.
Lyonia ferruginea Nutt.
Range: 29, 30.
Site: Well-drained, sun.
Fruit: Capsule.
A small to large evergreen shrub.

Xolisma ligustrina (L.) Britt. Maleberry.
Lyonia ligustrina (L.) DC., *Arsenococcus ligustrinus* (L.) Small, *Andromeda ligustrina* Muhl.
Range: 27, 28, 29, 30.
Site: Moist, sun, shade.
Fruit: Capsule.
A large shrub; flowers May–July.

Var. *foliosiflora* (Michx.) Fern., (*Arsenococcus frondosus* (Pursh) Small, *Xolisma foliosiflora* Small, *Lyonia frondosa* Pursh) is commoner southward.
Observations: Ignored by white-tailed deer in Massachusetts.

Xolisma lucida (Bartr.) Rehd. **Fetter bush.**
Lyonia nitida (Bartr.) Fern., *Pieris nitida* Benth. and Hook., *Desmothamnus lucidus* (Lam.) Small, *Neopieris nitida* (Bartr.) Britt.
Range: 29, 30.
Site: Well-drained, moist, sun, shade.
Fruit: Capsule.
A small to large evergreen shrub; flowers April–May.

Xolisma mariana (L.) Rehd. **Staggerbush.**
Lyonia mariana (L.) Don., *Neopieris mariana* (L.) Britt., *Pieris mariana* (L.) Benth. and Hook.
Range: 20, 27, 28, 29, 30.
Site: Well-drained, moist.
Fruit: Capsule.
A small shrub; flowers May–July; occurs in sandy soil. Foliage said to be poisonous to lambs and calves.

Xylococcus bicolor, see *Arctostaphylos bicolor.*

Xylosteon ciliatum, see *Lonicera canadensis.*

Xylosteon conjugiale, see *Lonicera conjugialis.*

Xylosteon involucrata, see *Lonicera involucrata.*

Xylosteon utahensis, see *Lonicera utahensis.*

Xylosteon villosum, see *Lonicera villosa.*

Xylosteon oblongifolia, see *Lonicera oblongifolia.*

Xylothermia montana, see *Pickeringia montana.*

Yucca spp. (pl. 44).
Generally slow-growing, simple-stemmed, treelike species often with very long roots; commonly occur in dry, sterile soils; stems commonly grow to keep pace with shifting sands; trunks occasionally used in construction; pollination rarely occurs unless a small white moth gathers the pollen and pushes it into the stigmatic tube, the larvae feeding exclusively on maturing seeds of the plant. Propagation is by seed, offsets, stems, or rhizome cuttings.
Stomach records (in addition to specific records): Band-tailed pigeon; wild turkey. *Observations* (in addition to specific records): Baccate fruit commonly eaten by birds and mammals; jack rabbit, rusty antelope squirrel, gray-tailed antelope squirrel, black-backed rock squirrel, mexican mule deer. Nearly all species are eaten by livestock if the tender parts are within reach. Some are of importance as honey plants.

Zanthoxylum, see *Xanthoxylum.*

Zenobia cassinefolia (Vent.) Poll.
Andromeda cassinefolia Vent.
Range: 29, 30.
Site: Well-drained, sun, shade.
Fruit: Capsule.
A small to large shrub.

Zenobia pulverulenta (Partr.) Poll. **Zenobia.**
Andromeda pulverulenta Bartr.
Range: 29, 30.
Site: Well-drained, sun, shade.
Fruit: Capsule.
A small to large shrub; occurs on sandy and other soils.

Zizyphus lycioides, see *Condalia lycioides.*

Zizyphus obtusifolia, see *Condalia obtusifolia.*

Zizyphus parryi, see *Condalia parryi.*

Zygia brevifolia, see *Pithecolobium brevifolium.*

Zygia flexicaulis, see *Pithecolobium flexicaule.*

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LIST OF COMMON NAMES OF WOODY PLANTS

Acacia, (*Albizzia julibrissin*).
  Dwarf (*Robinia nana*).
  False- (*Robinia pseudoacacia*).
  Fernleaf (*Acacia angustissima*).
  Green-barked (*Cercidium floridum Cercidium torreyanum*).
  Lemmon (*Acacia lemmonii*).
  Mescat (*Acacia constricta*).
  Netvein (*Acacia reticulata*).
  Prairie (*Acacia angustissima*).
  Rose- (*Robinia hispida*).
  Sweet (*Acacia farnesiana*).
Acequia willow (*Salix exigua*).
Adelia (*Forestiera acuminata*).
Adobe-land grape (*Vitis champinii*).
Agarita (*Berberis trifoliolata*).
Agrito (*Berberis trifoliolata*).
Ailanthus (*Ailanthus altissima*).
Alabama,
  azalea (*Rhododendron alabamense*).
  cherry (*Prunus alabamensis*).
  chinquapin (*Castanea alabamensis*).
  croton (*Croton alabamensis*).
  ninebark (*Physocarpus alabamensis*).
Alaska,
  cedar (*Chamaecyparis nootkatensis*).
  cypress (*Chamaecyparis nootkatensis*).
Albaricoque (*Prunus texana*).
Alberta spruce (*Picea albertiana*).
Alder,
  Black (*Ilex verticillata*).
  California (*Alnus rhombifolia*).
  European black (*Alnus glutinosa*).
  Green (*Alnus crispa*).
  Hazel (*Alnus rugosa*).
  Hoary (*Alnus incana*).
  Lanceleaf (*Alnus oblongifolia*).
  Mexican (*Alnus oblongifolia*).
  Mountain (*Alnus crispa, Alnus rhombifolia, Alnus sinuata, Alnus tenuifolia*).
  Northern (*Alnus sinuata*).
  Oregon (*Alnus rubra*).
  Paperleaf (*Alnus tenuifolia*).
  Red (*Alnus rubra*).
  Russet (*Alnus crispa*).
  Seaside (*Alnus maritima*).
  Sitka (*Alnus sinuata*).
  Smooth (*Alnus rugosa*).
  Speckled (*Alnus incana*).
  Tag (*Alnus tenuifolia*).
  Thinleaf (*Alnus sinuata, Alnus tenuifolia*).
  Western (*Alnus rubra*).

- Alder—Continued.
  - White (*Alnus rhombifolia, Clethra acuminata, Clethra alnifolia*).
- Alder buckthorn (*Rhamnus caroliniana*).
- Alderleaf mountain-mahogany (*Cercocarpus alnifolius*).
- Alder-leaved buckthorn (*Rhamnus alnifolia*).
- Algaroba (*Prosopis glandulosa*).
- Algerita (*Berberis haematocarpa*).
- Allegheny,
  - barberry (*Berberis canadensis*).
  - mountain-spurge (*Pachysandra procumbens*).
  - plum (*Prunus alleghениensis*).
- Alligator,
  - juniper (*Juniperus pachyphloea*).
  - wood (*Liquidambar styraciflua*).
- Allscale (*Atriplex polycarpa*).
- Allthorn (*Koeberlinia spinosa*).
- Almond, Texas (*Prunus minutiflora*).
- Alpine,
  - fir (*Abies lasiocarpa*).
  - gooseberry (*Ribes lepthanthum*).
  - larch (*larix lyallii*).
  - mountain-ash (*Sorbus occidentalis*).
- Ambrosia bur-sage (*Franseria ambrosioides*).
- American,
  - arborvitae (*Thuja occidentalis*).
  - aspen (*Populus tremuloides*).
  - barberry (*Berberis canadensis*).
  - bladdernut (*Staphylea trifolia*).
  - chestnut (*Castanea dentata*).
  - china-root (*Smilax pseudo-china*).
  - crab apple (*Malus coronaria*).
  - cranberry-bush (*Virburnum trilobum*).
  - dogberry (*Cornus stolonifera*).
  - elder (*Sambucus canadensis*).
  - elm (*Ulmus americana*).
  - fly honeysuckle (*Lonicera canadensis*).
  - hazelnut (*Corylus americana*).
  - holly (*Ilex opaca*).
  - ivy (*Parthenocissus quinquefolia*).
  - larch (*Larix laricina*).
  - linden (*Tilia glabra*).
  - mountain-ash (*Sorbus americana*).
  - olive (*Osmanthus americana*).
  - red currant (*Ribes triste*).
  - snowbell (*Styrax americana*).
  - storax (*Styrax americana*).
  - trixis (*Trixis californica*).
  - wisteria (*Wisteria frutescens*).
- Anacahuita (*Cordia boissieri*).
- Anacua (*Ehretia anacua*).
- Anderson,
  - desert-thorn (*Lycium andersonii*).
  - manzanita (*Arctostaphylos andersonii*).
- Angelica tree (*Aralia spinosa*).
- Anise, purple (*Illicium floridanum*).
- Antelope-brush (*Purshia glandulosa, Purshia tridentata*).
- Apache,
  - pine (*Pinus apacheca*).
  - plume (*Fallugia paradoxa*).
- Appalachian cherry (*Prunus pumila, Prunus susquehanae*).
- Apple,
  - Squaw (*Peraphyllum ramosissimum*).
  - Wild (*Peraphyllum ramosissimum*).
- Arborvitae (*Thuja occidentalis, Thuja plicata*).
  - American (*Thuja occidentalis*).
- Arizona,
  - ash (*Fraxinus velutina*).
  - buckthorn (*Bumelia lanuginosa*).
  - cottonwood (*Populus arizonica*).
  - cypress (*Cupressus arizonica*).
  - fir (*Abies arizonica*).
  - grape (*Vitis arizonica*).
  - honeysuckle (*Lonicera arizonica*).
  - madrone (*Arbutus arizonica*).
  - mesquite (*Prosopis chilensis*).
  - mountain-mahogany (*Cerococarpus arizonicus*).
  - pine (*Pinus arizonica*).
  - sycamore (*Platanus wrightii*).
  - walnut (*Juglans major*).
  - white oak (*Quercus arizonica*).
  - wild cotton (*Thurberia triloba*).
- Arrowwood (*Pluchea sericea, Viburnum acerifolium, Viburnum dentatum*).
  - Mapleleaf (*Viburnum acerifolium*).
  - Rough (*Viburnum scabrellum*).
  - Soft (*Viburnum molle*).
  - Soft-leaved (*Viburnum molle*).
  - Veiny (*Viburnum venosum*).
- Arroyo,
  - grape (*Vitis vulpina*).
  - willow (*Salix lasiolepis*).
- Ash,
  - Alpine mountain (*Sorbus occidentalis*).
  - American mountain (*Sorbus americana*).
  - Arizona (*Fraxinus velutina*).
  - Biltmore white (*Fraxinus biltmoreana*).
  - Black (*Fraxinus nigra*).
  - Blue (*Fraxinus quadrangulata*).
  - Brown (*Fraxinus nigra*).
  - Carolina (*Fraxinus caroliniana*).
  - Desert (*Fraxinus velutina*).
  - Dwarf (*Fraxinus anomala*).
  - European mountain (*Sorbus aucuparia*).
  - Flowering (*Fraxinus cuspidata, Fraxinus dipetala*).
  - Foothill (*Fraxinus dipetala*).
  - Fragrant (*Fraxinus cuspidata*).
  - Greene mountain (*Sorbus scovulina*).
  - Hoop (*Fraxinus nigra*)

- Ash—Continued.
  - Leatherleaf (*Fraxinus velutina*).
  - Littleleaf (*Fraxinus greggii*).
  - Mexican (*Fraxinus berlandieriana*).
  - Mountain (*Fraxinus texensis*, *Sorbus americana*).
  - Oregon (*Fraxinus oregona*).
  - Pacific mountain (*Sorbus sitchensis*).
  - Prickley (*Xanthoxylum spp.*).
  - Pumpkin (*Fraxinus profunda*).
  - Red (*Fraxinus pennsylvanica*).
  - Swamp (*Fraxinus caroliniana*).
  - Texas (*Fraxinus texensis*).
  - Thorny (*Aralia spinosa*).
  - Velvet (*Fraxinus velutina*).
  - Water (*Fraxinus caroliniana*, *Fraxinus pauciflora*).
  - Western mountain (*Sorbus sitchensis*).
  - White (*Fraxinus americana*).
  - Yellow (*Cladrastis lutea*).
- Ashe magnolia (*Magnolia ashei*).
- Ashes (*Fraxinus* spp.)
- Ash-leaved maple (*Acer negundo*).
- Ashy,
  - grape (*Vitis cinerea*).
  - hydrangea (*Hydrangea cinerea*).
- Asimina, Low (*Asimina pygmaea*).
- Aspen (*Populus tremuloides*).
  - American (*Populus tremuloides*).
  - Largetooth (*Populus grandidentata*).
  - Quaking (*Populus tremuloides*).
  - Trembling (*Populus tremuloides*).
- Autumn,
  - sage (*Salvia greggii*).
  - willow (*Salix serissima*).
- Azalea,
  - Alabama (*Rhododendron alabamense*).
  - California (*Rhododendron occidentale*).
  - Early (*Rhododendron canescens*).
  - False (*Rhododendron albiflorum*).
  - Flame (*Rhododendron calendulaceum*).
  - Hoary (*Rhododendron canescens*).
  - Pinkshell (*Rhododendron vaseyi*).
  - Purple (*Rhododendron nudiflorum*).
  - Smooth (*Rhododendron arborescens*).
  - Swamp (*Rhododendron viscosum*).
  - Sweet (*Rhododendron arborescens*).
  - Western (*Rhododendron occidentale*).
  - White (*Rhododendron viscosum*).
  - White-flowered (*Rhododendron albiflorum*).
  - Yellow (*Rhododendron calendulaceum*).
- Bailey,
  - cornel (*Cornus baileyi*).
  - grape (*Vitis baileyana*).
  - hop-hornbeam (*Ostrya baileyi*).
  - osier (*Cornus baileyi*).
- Baldcypress (*Taxodium distichum*).
- Balloon bush, California (*Staphylea bolanderi*).
- Balm-of-gilead (*Populus balsamifera*).
  - fir (*Abies balsamea*).
- Balsam, (*Abies balsamea*, *Abies concolor*, *Abies fraseri*, *Abies lasiocarpa*).
  - Single spruce (*Abies balsamea*).
- Balsam,
  - cottonwood (*Populus trichocarpa*).
  - fir (*Abies balsamea*, *Abies concolor*).
  - poplar (*Populus balsamifera*).
  - willow (*Salix balsamifera*).
- Bamboo, (*Smilax bona-nox*).
  - Red-berry (*Smilax walteri*).
  - Wild (*Smilax auriculata*).
- Bamboo vine (*Smilax laurifolia*).
- Banks pine (*Pinus banksiana*).
- Barbados cherry (*Malpighia glabra*).
- Barberry,
  - Allegheny (*Berberis canadensis*).
  - American (*Berberis canadensis*).
  - California (*Berberis californicum*, *Berberis pinnata*).
  - Cliff (*Berberis canadensis*).
  - Common (*Berberis vulgaris*).
  - Creeping (*Berberis repens*).
  - Desert (*Berberis fremontii*).
  - Dwarf (*Berberis pumila*).
  - European (*Berberis vulgaris*).
  - Fendler (*Berberis fendleri*).
  - Fremont (*Berberis fremontii*).
  - Thunberg (*Berberis thunbergii*).
- Barclay willow (*Salix barclayi*).
- Baretta (*Helietta parvifolia*).
- Barranca bush (*Ceanothus verrucosus*).
- Barren oak (*Quercus ilicifolia.* *Quercus marilandica*).
- Bartram serviceberry (*Amelanchier bartramiana*).
- Basin sagebrush (*Artemisia tridentata*)
- Basket,
  - oak (*Quercus durandii*, *Quercus prinus*).
  - willow (*Salix purpurea*).
- Basswood, (*Tilia* spp.)
  - White (*Tilia heterophylla*).
- Bastard,
  - cedar (*Libocedrus decurrens*).
  - oak (*Quercus coccinea*, *Quercus durandii*).
- Bay,
  - Lapland rose (*Rhododendron lapponicum*).
  - Loblolly (*Gordonia lasianthus*).
  - Mountain rose (*Rhododendron catawbiense*).
  - Poison (*Illicium floridanum*).
  - Red (*Gordonia lasianthus*, (*Persea borbonia*).
  - Silk (*Persea humilis*).
  - Smooth red (*Persea borbonia*).
  - Swamp (*Persea pubescens*).
  - Swamp red (*Persea pubescens*).

- Bay—Continued.
  - Sweet (*Persea borbonia*).
  - Tan (*Gordonia lasianthus*).
- Bay,
  - laurel (*Umbellularia californica*).
  - tree (*Umbellularia californica*).
- Bayberry (*Myrica carolinensis*).
- Beach,
  - heather (*Hudsonia tomentosa*).
  - plum (*Prunus maritima*).
- Beadtree (*Melia azedarach*).
- Beaked,
  - hazelnut (*Corylus rostrata*).
  - willow (*Salix bebbiana*).
- Bean,
  - Coral (*Sophora affinis*).
  - Evergreen coral (*Sophora secundiflora*).
  - Mescal (*Sophora secundiflora*).
- Bear
  - brush (*Garrya fremontii*).
  - huckleberry (*Gaylussacia ursina*).
  - oak (*Quercus ilicifolia*,
Quercus sadlerina).
- Bearberry (*Arctostaphylos uva-ursi*).
  - holly (*Ilex decidua*).
  - honeysuckle (*Lonicera involucrata*).
  - willow (*Salix uva-ursi*).
- Bearmat (*Chamaebatia foliolosa*).
- Beaver tree (*Magnolia virginiana*).
- Beaverwood (*Celtis occidentalis*).
- Bebb willow (*Salix bebbiana*).
- Bee-sage (*Hyptis emoryi*).
  - White (*Salvia apiana*).
- Beech (*Fagus grandifolia*).
  - Blue (*Carpinus caroliniana*).
  - Water (*Carpinus caroliniana*).
- Bell-rue (*Clematis verticillaris*).
- Belltree (*Halesia carolina*).
- Benjamin bush (*Benzoin aestivale*).
- Bennie bush (*Ceanothus papillosus*).
- Bessey cherry (*Prunus besseyi*).
- Big
  - buckeye (*Aesculus octandra*).
  - laurel (*Magnolia grandiflora*).
  - sagebrush (*Artemisia tridentata*).
  - saltbush (*Atriplex lentiformis*).
  - shellbark hickory (*Carya laciniosa*).
  - summer grape (*Vitis lincecumii*).
  - whortleberry (*Vaccinium membranaceum*).
- Bigberry juniper (*Juniperus megalocarpa*).
- Bigbud hickory (*Carya alba*).
- Bigcone
  - pine (*Pinus coulteri*).
  - spruce (*Pseudotsuga macrocarpa*).
- Bigelow sagebrush (*Artemisia bigelovii*).
- Bigleaf
  - magnolia (*Magnolia macrophylla*).
  - maple (*Acer macrophyllum*).
  - mountain mahogany (*Cercocarpus traskiae*).
  - shagbark hickory (*Carya laciniosa*).
- Bigpod ceanothus (*Ceanothus macrocarpus*).
- Bigtooth maple (*Acer grandidentatum*).
- Bigtree (*Sequoia washingtoniana*).
  - plum (*Prunus mexicana*).
- Bilberry,
  - Bog (*Vaccinium uliginosum*).
  - Dwarf (*Vaccinium caespitosum*).
  - Red (*Vaccinium parvifolium*).
  - Tall (*Vaccinium ovalifolium*).
- Biltmore white ash (*Fraxinus biltmoreana*).
- Birch,
  - Black (*Betula fontinalis*,
Betula lenta,
Betula nigra).
  - Blue (*Betula nigra*).
  - Blueleaf (*Betula coerulea*).
  - Bog (*Betula glandulosa*).
  - Canoe (*Betula papyrifera*).
  - Cherry (*Betula lenta*).
  - Dwarf (*Betula glandulosa*).
  - Gray (*Betula lutea*,
Betula populifolia).
  - Low (*Betula pumila*).
  - Mountain (*Betula fontinalis*).
  - Old field (*Betula populifolia*).
  - Paper (*Betula papyrifera*,
Betula populifolia).
  - Poverty (*Betula populifolia*).
  - Red (*Betula fontinalis*,
Betula nigra).
  - River (*Betula nigra*).
  - Scrub (*Betula glandulosa*).
  - Silver (*Betula lutea*).
  - Swamp (*Betula fontinalis*,
Betula pumila).
  - Sweet (*Betula lenta*).
  - Water (*Betula fontinalis*,
Betula nigra).
  - Western paper (*Betula papyrifera*).
  - White (*Betula papyrifera*,
Betula populifolia).
  - Yellow (*Betula lutea*).
- Birchleaf,
  - buckthorn (*Rhamnus betulaefolia*).
  - mahogany (*Cercocarpus montanus*).
  - mountain-mahogany (*Cercocarpus betuloides*).
- Bird cherry (*Osmaronia cerasiformis*,
Prunus avium,
Prunus pennsylvanica).
- Bishop pine (*Pinus muricata*).
- Bitter
  - buffaloberry (*Shepherdia canadensis*).
  - cherry (*Prunus emarginata*).
  - gooseberry (*Ribes amarum*).
  - nightshade (*Solanum dulcamara*).
  - orange (*Citrus trifoliata*).
  - pecan (*Carya aquatica*,
Carya cordiformis,
Carya texana).
- Bitter-bark (*Rhamnus purshiana*).
- Bitterbrush (*Purshia tridentata*).
- Bitterbush (*Cowania stansburiana*).
- Bitternut hickory (*Carya cordiformis*,
Carya glabra).

- Bittersweet (*Solanum dulcamara*).
  - Climbing (*Celastrus scandens*).
  - False (*Celastrus scandens*).
- Black,
  - alder (*Ilex verticillata*).
  - ash (*Fraxinus nigra*).
  - birch (*Betula fontinalis*, *Betula lenta*, *Betula nigra*).
  - blueberry (*Vaccinium atrococcum*).
  - cherry (*Prunus serotina*).
  - cherry, southwestern (*Prunus virens*).
  - chokeberry (*Aronia melanocarpa*).
  - chokeberry, western (*Prunus demissa*).
  - cottonwood (*Populus trichocarpa*).
  - currant (*Ribes americanum*).
  - cypress (*Taxodium distichum*).
  - elder (*Sambucus melanocarpa*).
  - gum (*Nyssa sylvatica*).
  - gum, highland (*Nyssa sylvatica*).
  - gum, southern (*Nyssa biflora*).
  - gum, swamp (*Nyssa biflora*).
  - haw, southern (*Viburnum rufidulum*).
  - hickory (*Carya alba*, *Carya glabra*).
  - highbush blueberry (*Vaccinium atrococcum*).
  - huckleberry (*Gaylussacia baccata*).
  - laurel (*Gordonia lasianthus*, *Leucothoë davisiae*).
  - locust (*Gleditsia triacanthos*, *Robinia pseudoacacia*).
  - maple (*Acer saccharum*).
  - mulberry (*Morus nigra*).
  - oak (*Quercus coccinea*, *Quercus emoryi*. *Quercus velutina*).
  - persimmon (*Diospyros texana*).
  - pine (*Pinus serotina*, *Pinus taeda*).
  - sage (*Artemisia arbuscula*, *Salvia mellifera*).
  - scrub oak (*Quercus ilicifolia*).
  - sloe (*Prunus umbellata*).
  - spruce (*Picea mariana*).
  - sugar maple (*Acer nigrum*).
  - titi (*Cliftonia monophylla*, *Cyrilla racemiflora*).
  - walnut (*Juglans nigra*).
  - walnut, California (*Juglans hindsii*).
  - walnut, Southern California (*Juglans californica*).
  - western chokecherry (*Prunus demissa*).
  - willow (*Salix nigra*).
  - willow, western (*Salix lasiandra*).
- Blackbead elder (*Sambucus melanocarpa*).
- Blackberries (*Rubus* spp.).
- Blackbruch (*Acacia amentacea*). (*Coleogyne ramosissima*, *Flourensia cernua*).
- Blackbush (*Coleogyne ramosissima*).
- Blackhaw (*Bumelia lanuginosa*, *Bumelia tenax*, *Viburnum prunifolium*).
  - Rusty (*Viburnum rufidulum*).
- Blackjack oak (*Quercus marilandica*).
- Blackthorn (*Viburnum lentago*).
- Bladder,
  - bush (*Salazaria mexicana*).
  - sage (*Salazaria mexicana*).
- Bladdernut,
  - American (*Staphylea trifolia*).
  - California (*Staphylea bolanderi*).
  - Sierra (*Staphylea bolanderi*).
- Bladderpod (*Isomeris arborea*).
- Blaspheme-vine (*Smilax laurifolia*).
- Blood currant (*Ribes sanguineum*).
- Bloomer goldenbush (*Aplopappus bloomeri*).
- Blue,
  - agarita (*Berberis swaseyi*).
  - ash (*Fraxinus quadrangulata*).
  - beech (*Carpinus caroliniana*).
  - birch (*Betula nigra*).
  - blossom (*Ceanothus thyrsiflorus*).
  - cornel (*Cornus alternifolia*).
  - dogwood (*Cornus alternifolia*).
  - elder (*Sambucus coerulea*).
  - fly-honeysuckle (*Lonicera villosa*).
  - jasmine (*Clematis crispa*).
  - myrtle (*Ceanothus thyrsiflorus*).
  - oak (*Quercus douglasii*).
  - palmetto (*Rhapidophyllum hystrix*).
  - poplar (*Liriodendron tulipifera*).
  - sage, shrubby (*Salvia ballotaeflora*).
  - spruce (*Picea pungens*).
  - tangle (*Gaylussacia frondosa*).
  - whortleberry (*Vaccinium ovalifolium*).
  - willow (*Salix subcoerulea*).
- Blueback willow (*Salix glaucops*).
- Blueberry,
  - Black (*Vaccinium atrococcum*).
  - Black highbush (*Vaccinium atrococcum*).
  - Bog (*Vaccinium uliginosum*).
  - Box (*Vaccinium ovatum*).
  - Canada (*Vaccinium canadense*).
  - Common (*Vaccinium corymbosum*).
  - Creeping (*Vaccinium crassifolium*).
  - Downy swamp (*Vaccinium atrococcum*).
  - Dryland (*Vaccinium vacillans*).
  - Dwarf (*Vaccinium angustifolium*).
  - Elliott (*Vaccinium elliottii*).
  - Evergreen (*Vaccinium myrsinites*).
  - Highbush (*Vaccinium corymbosum*).
  - Low (*Vaccinium vacillans*).
  - Low sweet (*Vaccinium angustifolium*).
  - Lowbush (*Vaccinium angustifolium*).
  - Rabbiteye (*Vaccinium virgatum*).
  - Sour-top (*Vaccinium canadense*).
  - Sugar (*Vaccinium angustifolium*).
  - Swamp (*Vaccinium corymbosum*).
  - Velvetleaf (*Vaccinium canadense*).

- Blueberry—Continued.
  - Western (*Vaccinium occidentale*).
  - Western bog (*Vaccinium occidentale*).
- Blueberry elder (*Sambucus caerulea*).
- Blueblossom (*Ceanothus thyrsiflorus*).
- Bluebrush (*Ceanothus integerrimus*, *Ceanothus thyrsiflorus*).
- Bluecurls (*Trichostema arizonicum*).
- Bluejack oak (*Quercus cinerea*).
- Blueleaf,
  - birch (*Betula coerulea*).
  - grape (*Vitis argentifolia*).
  - willow (*Salix glaucophylla*).
- Bluestem willow (*Salix irrorata*).
- Bluewood (*Condalia obovata*).
  - Mexican (*Condalia mexicana*).
- Bog,
  - bilberry (*Vaccinium uliginosum*).
  - birch (*Betula glandulosa*).
  - blueberry (*Vaccinium uliginosum*).
  - rosemary (*Andromeda polifolia*).
  - rosemary, downy (*Andromeda glaucophylla*).
  - spruce (*Picea mariana*).
  - wortleberry (*Vaccinium uliginosum*).
  - willow (*Salix pedicellaris*).
- Bois
  - d'arc (*Maclura pomifera*).
  - inconnu (*Celtis mississippiensis*).
- Bottlebrush buckeye (*Aesculus parviflora*).
- Bottom hickory (*Carya carolinae-septentrionalis*).
- Box
  - blueberry (*Vaccinium ovatum*).
  - huckleberry (*Gaylussacia brachycera*).
  - sandmyrtle (*Leiophyllum buxifolium*).
  - thorn (*Lycium halimifolium*).
  - thorn, California (*Lycium californicum*).
  - white oak (*Quercus stellata*).
- Boxelder (*Acer negundo*).
- Boxwood (*Cornus florida*).
  - false (*Gyminda latifolia*).
- Boynton oak (*Quercus boyntonii*).
- Brasil (*Condalia obovata*).
- Bray oak (*Quercus brayi*).
- Brewer
  - oak (*Quercus garryana*).
  - saltbush (*Atriplex breweri*).
  - spruce (*Picea breweriana*).
  - willow (*Salix breweri*).
- Brickellbush,
  - Desert (*Brickellia desertorum*).
  - Littleleaf (*Brickellia microphylla*).
  - Rigid (*Brickellia frutescens*).
- Bristlecone,
  - fir (*Abies venusta*).
  - pine (*Pinus aristanta*).
- Bristly.
  - greenbrier (*Smilax auriculata*, *Smilax hispida*).
  - locust (*Robinia hispida*).
- Broadleaf maple (*Acer macrophyllum*).
- Broadscale broom (*Lepidospartum latisquamum*).
- Brook feather (*Xanthorhiza simplicissima*).
- Broom,
  - Broadscale (*Lepidospartum latisquamum*).
  - Scotch (*Cytisus scoparius*).
- Broom,
  - brush (*Symphoricarpos orbiculatus*).
  - crowberry (*Corema conradii*).
  - hickory (*Carya glabra*).
- Brown,
  - ash (*Fraxinus nigra*).
  - crowberry (*Corema conradii*).
  - dogwood (*Cornus glabrata*).
- Brown's hickory (*Carya pecan*).
- Brush,
  - Black (*Acacia amentacea*).
  - Blue (*Ceanothus thyrsiflorus*).
  - Buck (*Ceanothus cuneatus*, *Ceanothus sanguineus*).
  - Coyote (*Baccharis pilularis*).
  - Deer (*Ceanothus crassifolius*, *Ceanothus fendleri*, *Ceanothus integerrimus*, *Ceanothus leucodermis*, *Ceanothus tomentosus*).
  - Douglas rabbit (*Chrysothamnus viscidiflorus*).
  - Javelin (*Microrhamnus ericoides*).
  - Jim (*Ceanothus sorediatus*).
  - Musk (*Ceanothus jepsonii*).
  - Red (*Lippia berlandieri*).
  - Rosin (*Baccharis sarothroides*).
  - Rubber rabbit (*Chrysothamnus nauseosus*).
  - Snow (*Ceanothus cordulatus*, *Ceanothus velutinus*).
  - Tobacco (*Ceanothus velutinus*).
  - Varnish (*Ceanothus velutinus*).
  - White (*Lippia ligustrina*).
- Bubby-blossoms (*Calycanthus floridus*).
- Buck,
  - oak (*Quercus coccinea*).
  - vine (*Brunnichia cirrhosa*).
- Buckberry (*Gaylussacia ursina*).
- Buckbrush (*Ceanothus cuneatus*, *Ceanothus fendleri*, *Ceanothus sanguineus*, *Symphoricarpos orbiculatus*).
- Buckeye,
  - Big (*Aesculus octandra*).
  - Bottlebrush (*Aesculus parviflora*).
  - California (*Aesculus californica*).
  - Fetid (*Aesculus glabra*).
  - Georgia (*Aesculus neglecta*).
  - Large (*Aesculus octandra*).
  - Mexican (*Ungnadia speciosa*).
  - New Mexico (*Ungnadia speciosa*).
  - Ohio (*Aesculus glabra*).
  - Red (*Aesculus pavia*).
  - Scarlet (*Aesculus discolor*, *Aesculus pavia*).

Buckeye—Continued.
  Shrubby (*Aesculus glabra*).
  Spanish (*Ungnadia speciosa*).
  Sweet (*Aesculus octandra*).
  Western (*Aesculus glabra*).
  Woolly (*Aesculus discolor*).
  Yellow (*Aesculus octandra*).
Buckthorn (*Bumelia cassinifolia, Rhamnus smithii, Sageretia minutaeflora*).
  Alder (*Rhamnus caroliniana*).
  Alder-leaved (*Rhamnus alnifolia*).
  Arizona (*Bumelia lanuginosa*).
  Birchleaf (*Rhamnus betulaefolia*).
  California (*Rhamnus californica*).
  Carolina (*Bumelia lycioides, Rhamnus caroliniana*).
  Cascara (*Rhamnus purshiana*).
  Dwarf (*Rhamnus alnifolia*).
  False (*Bumelia lanuginosa*).
  Hollyleaf (*Rhamnus crocea*).
  Lance-leaved (*Rhamnus lanceolata*).
  Mountain (*Bumelia monticola*).
  Narrow-leaved (*Rhamnus lanceolata*).
  Redstem (*Rhamnus rubra*).
  Smith (*Rhamnus smithii*).
  Southern (*Bumelia lycioides*).
  Tough (*Bumelia tenax*).
  Woolly (*Bumelia lanuginosa*).
  Yellow (*Rhamnus caroliniana*).
Buckthorn bumelia (*Bumelia lycioides*).
Buckwheat, California (*Eriogonum fasciculatum*).
Buckwheat vine (*Brunnichia cirrhosa*).
Buckwheatbrush,
  Slender (*Eriogonum microthecum*).
  Wright's (*Eriogonum wrightii*).
Bud sagebrush (*Artemisia spinescens*).
Budbrush (*Artemisia spinescens*).
Buffaloberry (*Shepherdia argentea*).
  Bitter (*Shepherdia canadensis*).
  Canadian (*Shepherdia canadensis*).
  Russet (*Shepherdia canadensis*).
  Sour (*Shepherdia argentea*).
Buffalo currant (*Ribes odoratum*).
Bull,
  bay (*Magnolia grandiflora*).
  grape (*Vitis rotundifolia*).
  pine (*Pinus ponderosa*).
Bullace,
  grape (*Vitis rotundifolia*).
  plum (*Prunus umbellata*).
Bullbrier (*Smilax bona-nox*).
Bullet grape (*Vitis rotundifolia*).
Bullnut hickory (*Carya alba*).
Bumelia, buckthorn (*Bumelia lycioides*).
Bunchberry elder (*Sambucus microbotrys*).
Bur oak (*Quercus macrocarpa*).
Bur, sand (*Franseria dumosa*).
Burningbush (*Evonymus atropurpureus*).
  Western (*Evonymus occidentalis*).
Burrobrush (*Hymenoclea monogyra*).
  White (*Hymenoclea salsola*).
Burro-fat (*Isomeris arborea*).
Burro-weed (*Allenrolfea occidentalis, Franseria dumosa*).
Bur-sage,
  Ambrosia (*Franseria ambrosioides*).
  Hollyleaf (*Franseria ilicifolia*).
  White (*Franseria dumosa*).
  Woolly (*Franseria eriocentra*).
Bush,
  Barranca (*Ceanothus verrucosus*).
  Benjamin (*Benzoin aestivale*).
  Bennie (*Ceanothus papillosus*).
  Buttonball (*Cephalanthus occidentalis*).
  Cattle (*Ceanothus parvifolius*).
  Creosote (*Covillea tridentata*).
  Cuyamaca (*Ceanothus palmeri*).
  Explorers (*Ceanothus oliganthus*).
  Fern (*Chamaebatia foliolosa, Chamaebatiaria millefolium*).
  Fetter (*Xolisma lucida*).
  Fever (*Benzoin aestivale*).
  Iodine (*Allenrolfea occidentalis*).
  Ione (*Ceanothus tomentosus*).
  Pine (*Aplopappus pinifolius*).
  Quinine (*Cowania stansburiana*).
  Ramona (*Ceanothus tomentosus*).
  Stagger (*Xolisma mariana*).
  Tansy (*Chamaebatiaria milefolium*).
  Tar (*Chamaebatia foliolosa*).
Bush,
  beardtoungue (*Pentstemon lemmonii.*)
  chinquapin (*Castanopsis sempervirens*).
  cinquefoil (*Potentilla fruticosa*).
  grape (*Vitis longii*).
  honeysuckle (*Diervilla lonicera*).
  monkey flower (*Mimulus aurantiacus*).
  paint-brush (*Castilleja hololeuca*).
  poppy (*Dendromecon rigida*).
  wintergreen (*Gaultheria ovatifolia*).
Bushmallow (*Malvastrum fasciculatum*).
  San Gabriel (*Malvastrum gabrielense*).
Bushmint, Emory (*Hyptis emoryi*).
Bushy samphire (*Allenrolfea occidentalis*).
Butternut (*Juglans cinerea*).
Button,
  alder (*Fothergilla major*).
  hazel (*Fothergilla major*).
Buttonball (*Platanus occidentalis*).
  bush (*Cephalanthus occidentalis*).
  tree (*Platanus occidentalis*).
Buttonwood (*Platanus occidentalis*).
Cabbage palmetto (*Sabal palmetto*).
Cabradora (*Lippia ligustrina*).
Cachanilla (*Pluchea sericea*).
Calcaire grape (*Vitis champinii*).
Calico-bush (*Kalmia latifolia*).
Calico-wood (*Halesia carolina*).

- California,
  - alder (*Alnus rhombifolia*).
  - azalea (*Rhodendron occidentale*).
  - balloon bush (*Staphylea bolanderi*).
  - barberry (*Berberis californicum, Berberis pinnata*).
  - bayberry (*Myrica californica*).
  - black currant (*Ribes malvaceum*).
  - black oak (*Quercus kellogii*).
  - black walnut (*Juglans californica, Juglans hindsii*).
  - bladdernut (*Staphylea bolanderi*).
  - blue oak (*Quercus douglasii*).
  - box thorn (*Lycium californicum*).
  - buckeye (*Aesculus californica*).
  - buckthorn (*Rhamnus californica*).
  - buckwheat (*Eriogonum fasciculatum*).
  - chestnut (*Castanopsis chrysophylla*).
  - chinquapin (*Castanopsis sempervirens*).
  - coffee berry (*Rhamnus californica*).
  - desert-thorn (*Lycium californicum*).
  - dutchman's pipe-vine (*Aristolochia californica*).
  - fremontia (*Fremontia californica*).
  - grape (*Vitis californica*).
  - greenbrier (*Smilax californica*).
  - hardtack (*Cercocarpus betuloides*).
  - hazelnut (*Corylus californica*).
  - holly (*Photinia arbutifolia*).
  - hollygrape (*Berberis californicum*).
  - hoptree (*Ptelea baldwinii*).
  - huckleberry (*Vaccinium ovatum*).
  - indigobush (*Amorpha californica*).
  - jointfir (*Ephedra californica*).
  - juniper (*Juniperus californica*).
  - laurel (*Umbellularia californica*).
  - lilac (*Ceanothus integerrimus, Ceanothus thyrsiflorus*).
  - live oak (*Quercus agrifolia*).
  - mahogany (*Rhus integrifolia*).
  - nutmeg (*Tumion californicum*).
  - redbud (*Cercis occidentalis*).
  - red fir (*Abies magnifica*).
  - redwood (*Sequoia sempervirens*).
  - rose bay (*Rhododendron californicum*).
  - sagebrush (*Artemisia californica*).
  - scrub oak (*Quercus dumosa*).
  - slippery elm (*Fremontia californica*).
  - spicebush (*Calycanthus occidentalis*).
  - sweetshrub (*Calycanthus occidentalis*).
  - sycamore (*Platanus racemosa*).
  - tanbark oak (*Quercus densiflora*).
  - treemallow (*Lavatera assurgentifolia*).
  - walnut (*Juglans californica*).
  - white oak (*Quercus lobata*).
  - wild grape (*Vitis californica*).
  - yerba santa (*Eriodictyon californicum*).
- Camellia,
  - Mountain (*Stuartia pentagyna*).
  - Silky (*Stuartia malachodendron*).
- Camelthorn (*Alhagi camelorum*).
- Canada,
  - hemlock (*Tsuga canadensis*).
  - plum (*Prunus nigra*).
  - serviceberry (*Amelanchier canadensis*).
  - yew (*Taxus brevifolia*).
- Canadian buffaloberry (*Shepherdia canadensis*).
- Canatilla (*Ephedra antisyphilitica*).
- Candleberry, (*Myrica carolinensis, Myrica cerifera*).
  - Dwarf (*Myrica pumila*).
  - Swamp (*Myrica carolinensis*).
- Candlewood (*Fouquieria splendens*).
- Can-hoop (*Ilex laevigata*).
- Canoe,
  - birch (*Betula papyrifera*).
  - cedar (*Thuja plicata*).
- Canyatilla (*Ephedra trifurca*).
- Canyon,
  - gooseberry (*Ribes menziesii*).
  - grape (*Vitis arizonica*).
  - live oak (*Quercus chrysolepis, Quercus wislizenii*).
  - tassel bush (*Garrya veatchii*).
- Capillaire (*Chiogenes hispidula*).
- Capul (*Schaefferia cuneifolia, Celtis pallida*).
  - negro (*Condalia obovata*).
- Carolina,
  - allspice (*Calycanthus floridus*).
  - ash (*Fraxinus caroliniana*).
  - buckthorn (*Bumelia lycioides, Rhamnus caroliniana*).
  - cherry (*Prunus caroliniana*).
  - cherry-laurel (*Prunus caroliniana*).
  - hemlock (*Tsuga caroliniana*).
  - moonseed (*Cebatha carolina*).
  - rhododendron (*Rhododendron carolinianum*).
- Carribean pine (*Pinus caribaea*).
- Cascara (*Rhamnus purshiana*).
- Cascara buckthorn (*Rhamnus purshiana*).
- Cassandra (*Chamaedaphne calyculata*).
- Cassena (*Ilex vomitoria*).
- Cassie (*Acacia farnesiana*).
- Cassioberry bush (*Ilex vomitoria*).
- Castor-bean (*Ricinus communis*).
- Cat,
  - grape (*Vitis palmata*).
  - spruce (*Picea canadensis*).
- Catalina,
  - cherry (*Prunus lyonii*).
  - hard-tack (*Cercocarpus traskiae*).
  - ironwood (*Lyonothamnus floribundus*).
- Catawba rhododendron (*Rhododendron catawbiense*).
- Catbird grape (*Vitis palmata*).
- Catbrier (*Smilax rotundifolia*).
- Catclaw (*Acacia emoryana, Acacia tortuosa, Mimosa borealis, Mimosa biuncifera*).

- Catclaw—Continued.
  - Long-flowered (*Acacia greggii*).
  - Round-flowered (*Acacia roemeriana*).
  - Texas (*Acacia wrightii*).
  - Tree (*Acacia wrightii*).
- Cattle,
  - bush (*Ceanothus parvifolius*).
  - spinach (*Atriplex polycarpa*).
- Caudate willow (*Salix caudata*).
- Ceanothus,
  - Bigpod (*Ceanothus macrocarpus*).
  - Fendler (*Ceanothus fendleri*).
  - Greenbark (*Ceanothus spinosus*).
  - Gregg (*Ceanothus greggii*).
  - Hairy (*Ceanothus oliganthus*).
  - Hoary-leaf (*Ceanothus crassifolius*).
  - Hollyleaf (*Ceanothus jepsonii*).
  - Jepson (*Ceanothus jepsonii*).
  - Littleleaf (*Ceanothus parvifolius*).
  - Martin (*Ceanothus martinii*).
  - Redstem (*Ceanothus sanguineus*).
  - Rigid (*Ceanothus rigidus*).
  - Trailing (*Ceanothus diversifolius*).
  - Wartystem (*Ceanothus verrucosus*).
  - Wavyleaf (*Ceanothus foliosus*).
  - Wedgeleaf (*Ceanothus cuneatus*).
  - Woolyleaf (*Ceanothus tomentosus*).
- Cedar (*Libocedrus decurrens*, *Thuja occidentalis*, *Thuja plicata*).
  - Alaska (*Chamaecyparis nootkatensis*).
  - Bastard (*Libocedrus decurrens*).
  - Canoe (*Thuja plicata*).
  - Eastern red (*Juniperus virginiana*).
  - Incense (*Libocedrus decurrens*).
  - Mountain (*Juniperus mexicana*).
  - Mountain red (*Juniperus scopulorum*).
  - Northern white (*Thuja occidentalis*).
  - Port Orford (*Chamaecyparis lawsoniana*).
  - Post (*Libocedrus decurrens*).
  - Red (*Juniperus scopulorum*, *Juniperus viriginana*, *Thuja plicata*).
  - Southern red (*Juniperus lucayana*).
  - Southern white (*Chamaecyparis thyoides*).
  - Stinking (*Tumion taxifolium*).
  - Western red (*Thuja plicata*).
  - White (*Chamaecyparis lawsoniana*, *Libocedrus decurrens*, *Thuja occidentalis*).
  - elm (*Ulmus crassifolia*).
  - pine (*Pinus glabra*).
- Cenizo (*Leucophyllum frutescens*).
- Chacate (*Krameria grayi*).
- Chalk maple (*Acer leucoderme*).
- Chalky leucaena (*Leucaena pulverulenta*).
- Chamis (*Atriplex canescens*).
- Chamise (*Adenostoma fasciculatum*, *Atriplex canescens*).
- Chamiso (*Adenostoma fassiculatum*, *Atriplex canescens*).
- Chamisso lupine (*Lupinus chamissonis*).
- Chamiza (*Atriplex canescens*).
- Chaparral (*Ceanothus cuneatus*).
  - broom (*Baccharis pilularis*).
  - goldenbush (*Aplopappus propinquus*).
  - honeysuckle (*Lonicera interrupta*).
  - pea (*Pickeringia montana*).
  - whitethorn (*Ceanothus leucodermis*).
- Champin grape (*Vitis champinii*).
- Chapman,
  - oak (*Quercus champanii*).
  - white oak (*Quercus chapmanii*).
- Chapotillo (*Amyris texana*).
- Chayote (*Diospyros texana*).
- Checkerberry (*Gaultheria procumbens*).
- Cherry,
  - Alabama (*Prunus alabamensis*).
  - Appalachian (*Prunus susquehanae*, *Prunus pumila*).
  - Barbados (*Malpighia glabra*).
  - Bessey (*Prunus besseyi*).
  - Bird (*Prunus avium*, *Prunus pennsylvanica*).
  - Bitter (*Prunus emarginata*).
  - Black (*Prunus serotina*).
  - Carolina (*Prunus caroliniana*).
  - Catalina (*Prunus lyonii*).
  - Crab (*Prunus avium*).
  - Cuthbert's (*Prunus cuthbertii*).
  - Dwarf (*Prunus pumila*).
  - Evergreen (*Prunus ilicifolia*).
  - Fire (*Prunus pennsylvanica*).
  - Island (*Prunus lyonii*).
  - Laurel (*Prunus caroliniana*).
  - Littleleaf (*Prunus minutiflora*).
  - Mahaleb (*Prunus mahaleb*).
  - May (*Amelanchier canadensis*).
  - Morello (*Prunus cerasus*).
  - Mountain (*Prunus angustifolia*).
  - Munson (*Prunus munsoniana*).
  - Perfumed (*Prunus mahaleb*).
  - Pigeon (*Prunus pennsylvanica*).
  - Pin (*Prunus pennsylvanica*).
  - Plumleaf (*Prunus emarginata*).
  - Quinine (*Prunus emarginata*).
  - Rocky Mountain red (*Prunus corymbulosa*).
  - Rum (*Prunus serotina*).
  - Sand (*Prunus pumila*).
  - Sour (*Prunus cerasus*).
  - Southern wild (*Prunus australis*).
  - Southwestern black (*Prunus virens*).
  - Sweet (*Prunus avium*).
  - Western choke (*Prunus demissa*).
  - Western sand (*Prunus besseyi*).
  - Wild (*Prunus emarginata*, *Prunus serotina*).
  - Wild black (*Prunus serotina*).
  - Wild red (*Prunus pennsylvanica*).
- Cherry,
  - birch (*Betula lenta*).
  - willow (*Salix monticola*).

Cherry-laurel, Carolina (*Prunus caroliniana*).
Cherrystone juniper (*Juniperus monosperma*).
Chestnut oak (*Quercus montana*).
Chickasaw plum (*Prunus angustifolia, Prunus umbellata*).
Chicken grape (*Vitis cordifolia*).
Chico (*Sarcobatus vermiculatus*).
  bush (*Sarcobatus vermiculatus*).
Chihuahua pine (*Pinus leiophylla*).
China-tree (*Melia azedarach*).
Chinaberry (*Melia azedarach*).
Chinabrier (*Smilax pseudo-china, Smilax bona-nox*).
Chinquapin (*Castanea pumila, Castanopsis chrysophylla*).
  Alabama (*Castanea alabamensis*).
  Bush (*Castanopsis sempervirens*).
  California (*Castanopsis sempervirens*).
  Coastal (*Castanea ashei*).
  Dwarf (*Castanea alnifolia*).
  Goldleaf (*Castanopsis chrysophylla, Castanopsis sempervirens*).
  Giant (*Castanopsis chrysophylla*).
  Ozark (*Castanea ozarkensis*).
Chinquapin oak (*Quercus muehlenbergii*).
Chisos red oak (*Quercus gravesii*).
Chittim-bark (*Rhamnus purshiana*).
Chokeberry,
  Black (*Aronia melanocarpa*).
  Purple (*Aronia arbutifolia*).
  Red (*Aronia arbutifolia*).
Chokecherry (*Prunus virginiana*).
  Western black (*Prunus demissa*).
Christmas holly (*Ilex opaca*).
Christmasberry (*Lycium californicum, Lycium carolinianum, Photinia arbutifolia*).
Chuperosa (*Beloperone californica*).
Cinnamon wood (*Sassafras albidum*).
Clammy locust (*Robinia viscosa*).
Clematis,
  Curly (*Clematis crispa*).
  Drummond (*Clematis drummondii*).
  Mountain (*Clematis verticillaris*).
  New Mexico (*Clematis neomexicana*).
  Red-flowered (*Clematis pitcheri*).
  Smooth (*Clematis addisonii*).
  Virginia (*Clematis virginiana*).
Cliff,
  barberry (*Berberis canadensis*).
  elm (*Ulmus racemosa*).
Cliffbush (*Jamesia americana*).
Cliff-green (*Pachistima canbyi*).
Cliffrose (*Cowania stansburiana*).
Climbing,
  bittersweet (*Celastrus scandens*).
  hydrangea (*Decumaria barbara*).
  nightshade (*Solanum dulcamara*).
Cloud-cap gooseberry (*Ribes montigenum*).
Cluster serviceberry (*Amelanchier polycarpa*).
Coachwhip (*Fouquieria splendens*).
Coast,
  ceanothus (*Ceanothus rigidus*).
  goldenbush (*Aplopappus squarrosus*).
  juniper (*Juniperus lucayana*).
  live oak (*Quercus agrifolia, Quercus pricei*).
  rhododendron (*Rhododendron californicum*).
  silktassel (*Garrya elliptica*).
  whitethorn (*Ceanothus incanus*).
  willow (*Salix hookeriana*).
Coastal,
  chinquapin (*Castanea ashei*).
  sagebrush (*Artemisia californica*).
Coffeeberry (*Rhamnus californica*).
Coffeetree (*Rhamnus purshiana*).
  Kentucky (*Gymnocladus dioica*).
Colima (*Xanthoxylum fagara*).
Colorado,
  blue spruce (*Picea pungens*).
  currant (*Ribes coloradense*).
  Douglas fir (*Pseudotsuga glauca*).
  juniper (*Juniperus scopulorum*).
  sage (*Artemisia tridentata*).
  white fir (*Abies concolor*).
  white oak (*Quercus leptophylla*).
Coma (*Bumelia lanuginosa*).
Common,
  barberry (*Berberis vulgaris*).
  blueberry (*Vaccinium corymbosum*).
  greenbrier (*Smilax rotundifolia*).
  manzanita (*Arctostaphylos manzanita*).
  papaw (*Asimina triloba*).
Cooper,
  desert-thorn (*Lycium cooperi*).
  goldenbush (*Aplopappus cooperi*).
Coral,
  greenbrier (*Similar lanceolata, Smilax walteri*).
  honeysuckle (*Lonicera sempervirens*).
Coralbeads (*Cebatha carolina*).
Coralbean (*Erythrina flabelliformis, Sophora affinis*).
  Evergreen (*Sophora secundiflora*).
Coralberry (*Symphoricarpos orbiculatus*).
Cork elm (*Ulmus alata, Ulmus racemosa*).
Corkbark fir (*Abies arizonica*).
Corkwood (*Stillingia aquatica, Leitneria floridana*).
Cornel,
  Bailey (*Cornus baileyi*).
  Rough-leaved (*Cornus asperifolia, Cornus circinata*).
  Silky (*Cornus amomum*).
  Stiff (*Cornus foemina*).
  White (*Cornus foemina*).
Corona del Cristo (*Dalea spinosa*).

Correosa (*Rhus microphylla*, *Xanthoxylum fagara*).
Cotton, Arizona wild (*Thurberia triloba*).
Cotton,
  gum (*Nyssa aquatica*).
  thorn (*Tetradymia spinosa*).
Cottonwood (*Populus deltoides*, *Populus trichocarpa*).
  Arizona (*Populus arizonica*).
  Balsam (*Populus trichocarpa*).
  Black (*Populus trichocarpa*).
  Eastern (*Populus deltoides*).
  Fremont (*Populus fremontii*).
  Lanceleaf (*Populus acuminata*).
  Narrowleaf (*Populus angustifolia*).
  Palmer (*Populus palmeri*).
  River (*Populus sargentii*).
  Sargent (*Populus sargentii*).
  Smooth (*Populus acuminata*).
  Smoothbark (*Populus acuminata*).
  Swamp (*Populus heterophylla*).
  Texas (*Populus texana*).
  Tweedy's (*Populus tweedyi*).
  Valley (*Populus wislizenii*).
  Western (*Populus sargentii*).
  Willow (*Populus angustifolia*).
  Wislizenius (*Populus wislizenii*).
Coulter pine (*Pinus coulteri*).
Cow oak (*Quercus prinus*).
Cow-itch (*Campsis radicans*, *Cissus arborea*).
  vine (*Decumaria barbara*).
Cowlicks (*Halesia diptera*).
Coyote,
  brush (*Baccharis pilularis*).
  willow (*Salix exigua*).
Coyotillo (*Karwinskia humboldtiana*).
Crab apple (*Malus glabrata*, *Malus glaucescens*, *Malus platycarpa*).
  American (*Malus coronaria*).
  Iowa (*Malus ioensis*).
  Lanceleaf (*Malus lancifolia*).
  Narrowleaf (*Malus angustifolia*).
  Oregon (*Malus fusca*).
  Prairie (*Malus ioensis*).
  Soulard (*Malus soulardii*).
  Sweet (*Malus coronaria*).
  Western (*Malus fusca*, *Malus ioensis*).
Crab cherry (*Prunus avium*).
Crack willow (*Salix fragilis*).
Cranberry (*Vaccinium macrocarpon*).
  Highbush (*Viburnum trilobum*).
  Mountain (*Hugeria erythrocarpa*, *Vaccinium vitis-idaea*).
  Small (*Vaccinium oxycoccus*).
Cranberrybush
  American (*Viburnum trilobum*).
Cream bush (*Holodiscus discolor*).
Creosote bush (*Covillea tridentata*).
Creek,
  dogwood (*Cornus californica*).
  plum (*Prunus rivularis*).
Creeping,
  barberry (*Berberis repens*).
  blueberry (*Vaccinium crassifolium*).
  hollygrape (*Berberis repens*).
  shadbush (*Amelanchier stolonifera*).
  snowberry (*Chiogenes hispidula*).
  witch alder (*Fothergilla parvifolia*).
Crimson monkeyflower (*Mimulus puniceus*).
Crooked bush (*Forestiera acuminata*).
Crossvine (*Bignonia capreolata*).
Croton,
  Alabama (*Croton alabamensis*).
  Shrubby (*Croton fruticulosus*).
Crowberry, (*Empetrum nigrum*).
  Broom (*Corema conradii*).
  Brown (*Corema conradii*).
  Plymouth (*Corema conradii*).
Crown-of-thorns (*Koeberlinia spinosa*).
Crucifixion thorn (*Canotia holacantha*, *Holacantha emoryi*).
Cucumber magnolia (*Magnolia acuminata*).
Cucumbertree (*Magnolia acuminata*).
  Large-leaved (*Magnolia macrophylla*).
  Long-leaved (*Magnolia fraseri*).
  Yellow (*Magnolia cordata*).
Cupseed (*Calycocarpum lyonii*).
Curly clematis (*Clematis crispa*).
Curl-flower (*Clematis crispa*).
Curlleaf mountain-mahogany (*Cercocarpus ledifolius*).
Currant,
  American red (*Ribes triste*).
  Black (*Ribes americanum*).
  Blood (*Ribes sanguineum*).
  Buffalo (*Ribes odoratum*).
  California black (*Ribes malvaceum*).
  Colorado (*Ribes coloradense*).
  Fetid (*Ribes glandulosum*).
  Golden (*Ribes aureum*, *Ribes odoratum*).
  Gooseberry (*Ribes montigenum*).
  Hudson Bay (*Ribes hudsonianum*).
  Missouri (*Ribes odoratum*).
  Mountain (*Ribes viscosissimum*).
  Nevada (*Ribes nevadense*).
  Red-flowered (*Ribes sanguineum*).
  Rothrock (*Ribes wolfii*).
  Sheep (*Ribes cereum*).
  Sierra (*Ribes nevadense*).
  Skunk (*Ribes bracteosum*, *Ribes glandulosum*, *Ribes prostratum*).
  Squaw (*Ribes cereum*).
  Sticky (*Ribes viscosissimum*).
  Stink (*Ribes bracteosum*).
  Swamp (*Ribes lacustre*).
  Viscid (*Ribes viscosissimum*).
  Wax (*Ribes cereum*).
  Western black (*Ribes laxiflorum*).
  Winter (*Ribes sanguineum*).
  Wolf (*Ribes wolfii*).
Currant grape (*Vitis simpsonii*).
Curtiss grape (*Vitis sola*).

- Cusick serviceberry (*Amelanchier cusickii*).
- Custard-apple (*Asimina triloba*).
- Cuthbert's cherry (*Prunus cuthbertii*).
- Cuyamaca bush (*Ceanothus palmeri*).
- Cypress, (*Taxodium distichum*).
  - Alaska (*Chamaecyparis nootkatensis*).
  - Arizona (*Cupressus arizonica*).
  - Bald (*Taxodium distichum*).
  - Black (*Taxodium distichum*).
  - Forbe's (*Cupressus gaudeloupensis*).
  - Gowen (*Cupressus goveniana*).
  - Guadeloupe (*Cupressus guadeloupensis*).
  - Lawson (*Chamaecyparis lawsoniana*).
  - Macnab (*Cupressus macnabiana*).
  - Monterey (*Cupressus macrocarpa*).
  - Pond (*Taxodium ascendens*).
  - Red (*Taxodium distichum*).
  - Sargent (*Cupressus sargentii*).
  - Sitka (*Chamaecyparis nootkatensis*).
  - Smooth (*Cupressus glabra*).
  - Southern (*Taxodium distichum*).
  - Tecate (*Cupressus guadeloupensis*).
  - White (*Taxodium distichum*).
- Dahoon holly (*Ilex cassine*).
- Dalea,
  - Fremont (*Dalea fremontii*).
  - Mesa (*Dalea schottii*).
  - Mohave (*Dalea arborescens*).
  - Nevada (*Dalea polyadenia*).
  - White (*Dalea emoryi*).
- Damianita (*Chrysactinia mexicana*).
- Dangleberry (*Gaylussacia frondosa*).
- Davidson globemallow (*Malvastrum davidsonii*).
- Deciduous holly (*Ilex decidua*).
- Deer,
  - brush (*Ceanothus crassifolius,*
    Ceanothus fendleri,
    Caenothus integerrimus,
    Ceanothus leucodermis,
    Ceanothus tomentosus).
  - oak (*Quercus sadleriana*).
  - plum (*Chrysobalanus oblongifolius*).
- Deerberry (*Vaccinium stamineum*).
- Deerweed (*Ceanothus papillosus*).
- Delta palmetto (*Sabal louisiana*).
- Desert,
  - almond (*Prunus fasciculata*).
  - apricot (*Prunus eriogyna*).
  - ash (*Fraxinus velutina*).
  - barberry (*Berberis fremontii*).
  - brickellbush (*Brickellia desertorum*).
  - ceanothus (*Ceanothus greggii*).
  - grape (*Vitis girdiana*).
  - hackberry (*Celtis pallida*).
  - holly (*Atriplex hymenelytra*).
  - ironwood (*Olneya tesota*).
  - lavender (*Hyptis emoryi*).
  - mahogany (*Cercocarpus ledifolius*).
  - peach (*Prunus andersonii*).
  - polygala (*Polygala acanthoclada*).
  - sage (*Salvia carnosa*).
- Desert—Continued.
  - silver-bush (*Shepherdia rotundifolia*).
  - walnut (*Juglans rupestris*).
  - willow (*Chilopsis linearis*).
  - yaupon (*Schaefferia cuneifolia*).
- Desert-rue, Mohave (*Thamnosma montana*)
- Desert-sweet (*Chamaebatiaria millefolium*).
- Desert-thorn,
  - Anderson (*Lycium andersonii*).
  - California (*Lycium californicum*).
  - Cooper (*Lycium cooperi*).
  - Fremont (*Lycium fremontii*).
  - Pale (*Lycium pallidum*).
  - Parish (*Lycium parishii*).
  - Squaw (*Lycium torreyi*).
- Desertwillow (*Chilopsis linearis*).
- Devil's claw (*Acacia greggii*).
- Devilsclub (*Oplopanax horridum*).
- Devils-walking stick (*Aralia spinosa*).
- Devilwood (*Osmanthus armericana*).
- Dewberries (*Rubus* spp.).
- Diamond willow (*Salix mackenziana*).
- Digger pine (*Pinus sabiniana*).
- Doan grape (*Vitis doaniana*).
- Dockmackie (*Viburnum acerifolium*).
- Dogberry (*Ribes cynosbatii*).
- Dog-hobble (*Leucothoë catesbaei*).
- Dogwood,
  - Blue (*Cornus alternifolia*).
  - Brown (*Cornus glabrata*).
  - Creek (*Cornus californica*).
  - Florida (*Cornus florida*).
  - Flowering (*Cornus florida,*
    Cornus nuttallii).
  - Gray (*Cornus paniculata*).
  - Gray-stemmed (*Cornus paniculata*).
  - Miner's (*Cornus sessilis*).
  - Mountain (*Cornus nuttallii*).
  - Pale (*Cornus obliqua*).
  - Panicled (*Cornus paniculata*).
  - Purple (*Cornus alternifolia*).
  - Rough-leaved (*Cornus asperifolia*).
  - Stiff (*Cornus foemina*).
  - Western (*Cornus nuttallii*).
- Double spruce (*Picea mariana*).
- Douglas,
  - fir, Colorado (*Pseudotsuga glauca*).
  - fir, Oregon (*Pseudotsuga taxifolia*).
  - hackberry (*Celtis douglasii*).
  - honeysuckle (*Lonicera glaucescens*).
  - rabbitbrush (*Chrysothamnus viscidiflorus*).
  - spiraea (*Spiraea douglasii*).
  - spruce (*Pseudotsuga glauca,*
    Pseudotsuga taxifolia).
- Downward plum (*Bumelia spiniflora*).
- Downy,
  - bog rosemary (*Andromeda glaucophylla.*)
  - grape (*Vitis cinerea*).
  - poplar (*Populus heterophylla*).
  - serviceberry (*Amelanchier canadensis*).

- Downy—Continued.
  - storax (*Styrax pulverulenta*).
  - swamp blueberry (*Vaccinium atrococcum*).
  - viburnum (*Viburnum pubescens*).
- Drago, sangre de (*Jatropha spathulata*).
- Drooping juniper (*Juniperus flaccida*).
- Drummond
  - clematis (*Clematis drummondii*).
  - soapberry (*Sapindus drummondii*).
  - waxmallow (*Malvaviscus drummondii*).
- Dryland blueberry (*Vaccinium vacillans*).
- Duck oak (*Quercus nigra*).
- Dudley willow (*Salix goodingii*).
- Dunbar crab (*Malus glaucescens*).
- Dune,
  - lupine (*Lupinus chamissonis*).
  - willow (*Salix piperi*).
- Durand,
  - oak (*Quercus durandii*).
  - white oak (*Quercus durandii*).
- Durasnillo (*Prunus texana*).
- Dusky willow (*Salix melanopsis*).
- Dutchmans pipe (*Aristolochia durior*).
- Dutchman's pipe-vine (*Aristolochia durior*).
- Dwarf,
  - acacia (*Robinia nana*).
  - ash (*Fraxinus anomala*).
  - barberry (*Berberis pumila*).
  - bilberry (*Vaccinium caespitosum*).
  - birch (*Betula glandulosa*).
  - blueberry (*Vaccinium angustifolium*).
  - buckthorn (*Rhamnus alnifolia*).
  - candleberry (*Myrica pumila*).
  - cherry (*Prunus pumila*).
  - chinquapin (*Castanea alnifolia*).
  - chinquapin oak (*Quercus prinoides*).
  - goldenbush (*Aplopappus nanus*).
  - gray willow (*Salix tristis*).
  - greasebush (*Forsellesia pungens*).
  - hollygrape (*Berberis pumila*).
  - huckleberry (*Gaylussacia dumosa*).
  - indigobush (*Amorpha microphylla*).
  - juniper (*Juniperus communis*).
  - maple (*Acer glabrum*).
  - mesquite (*Acacia reticulata*).
  - ninebark (*Physocarpus alternans*).
  - papaw (*Asimina parviflora*).
  - palmetto (*Sabal minor*).
  - pussy willow (*Salix tristis*).
  - red huckleberry (*Vaccinium scoparium*).
  - serviceberry (*Amelanchier oblongifolia*).
  - spiraea (*Spiraea corymbosa*,
    Spirea caespitosa).
  - sumac (*Rhus copallina*).
  - tassel bush (*Garrya flavescens*).
  - wax myrtle (*Myrica pumila*).
  - witch-alder (*Fothergilla gardenii*).
  - whortleberry (*Vaccinium caespitosum*).
- Dwarf-acacia (*Robinia nana*).
- Dyer's
  - greenweed (*Genista tinctoria*).
  - oak (*Quercus velutina*).
- Eardrop (*Brunnichia cirrhosa*).
- Ear-leaved umbrella tree (*Magnolia fraseri*).
- Early azalea (*Rhododendron canescens*).
- Eastern,
  - cottonwood (*Populus deltoides*).
  - hemlock (*Tsuga canadensis*).
  - redcedar (*Juniperus virginiana*).
- Eastwood manzanita (*Arctostaphylos glandulosa*).
- Elbow bush (*Forestiera pubescens*).
- Elder (*Sambucus canadensis*).
  - American (*Sambucus canadensis*).
  - Black (*Sambucus melanocarpa*).
  - Blackbead (*Sambucus melanocarpa*).
  - Blue (*Sambucus coerulea*).
  - Blueberry (*Sambucus coerulea*).
  - Box (*Acer negundo*).
  - Bunchberry (*Sambucus microbotrys*).
  - Mexican (*Sambucus mexicana*).
  - Mountain (*Sambucus coerulea*).
  - Red (*Sambucus callicarpa*,
    Sambucus pubens).
  - Redberry (*Sambucus callicarpa*).
  - Velvetleaf (*Sambucus caerulea*).
  - Yellow (*Tecoma stans*).
- Elderberry, pale (*Sambucus coerulea*).
- Elephant tree (*Bursera microphylla*).
- Elliott's blueberry (*Vaccinium elliottii*).
- Elm,
  - American (*Ulmus americana*).
  - California slippery (*Fremontia californica*)
  - Cedar (*Ulmus crassifolia*).
  - Cliff (*Ulmus racemosa*).
  - Cork (*Ulmus alata*,
    Ulmus racemosa).
  - Gray (*Ulmus americana*).
  - Red (*Ulmus alata*,
    Ulmus fulva,
    Ulmus serotina).
  - Rock (*Ulmus racemosa*).
  - September (*Ulmus serotina*).
  - Slippery (*Ulmus fulva*).
  - Texas (*Ulmus crassifolia*).
  - Water (*Ulmus americana*).
  - White (*Ulmus americana*).
  - Winged (*Ulmus alata*).
- Emory,
  - bushmint (*Hyptis emoryi*).
  - oak (*Quercus emoryi*).
- Encina (*Quercus agrifolia*).
- Engelmann spruce (*Picea engelmannii*).
- Estafiata (*Artemisia frigida*).
- European,
  - barberry (*Berberis vulgaris*).
  - black alder (*Alnus glutinosa*).
  - mountain-ash (*Sorbus aucuparia*).
  - white willow (*Salix alba*).

Evergreen,
  blueberry (*Vaccinium myrsinites*).
  cherry (*Prunus ilicifolia*).
  coralbean (*Sophora secundiflora*).
  huckleberry (*Vaccinium ovatum*).
  magnolia (*Magnolia grandiflora*).
  oak (*Quercus engelmannii*).
  sumac (*Rhus virens*).
  white oak (*Quercus engelmannii*).
  winterberry (*Ilex glabra*).
Explorers' bush (*Ceanothus oliganthus*).
Fall grape (*Vitis berlandieri*).
False
  acacia (*Robinia pseudoacacia*).
  bittersweet (*Celastrus scandens*).
  boxwood (*Gyminda latifolia*).
  buckthorn (*Bumelia lanuginosa*).
  greasewood (*Amorpha canescens*).
  jessamine (*Gelsemium sempervirens*).
  mountain willow (*Salix pseudomonticola*).
  willow (*Baccharis angustifolia*).
False-azalea (*Rhododendron albiflorum*).
False-indigo (*Amorpha californica*,
    Amorpha fruticosa).
Falsemallow, newberry (*Horsfordia newberryi*).
False-mesquite (*Calliandra eriophylla*).
Fan palm (*Washingtonia robusta*).
Farkleberry (*Vaccinium arboreum*).
Farr willow (*Salix farrae*).
Fat pine (*Pinus australis*).
Feather peabush (*Dalea formosa*).
Fendler,
  barberry (*Berberis fendleri*).
  ceanothus (*Ceanothus fendleri*).
  oak (*Quercus fendleri*).
  soapbloom (*Ceanothus fendleri*).
Fern-bush (*Chamaebatia foliolosa*,
    Chamaebatriaria millefolium).
Fernleaf acacia (*Acacia angustissima*).
Fetid,
  buckeye (*Aesculus glabra*).
  currant (*Ribes glandulosum*).
Fetter-bush (*Leucothoë catesbaei*,
    Xolisma lucida).
Feverbush (*Benzion aestivale*,
    Ilex verticillata.)
Fever-tree (*Pinckneya pubens*).
Fiddlewood (*Citharexylum fruticosum*).
Fir,
  Alpine (*Abies lasiocarpa*).
  Arizona (*Abies arizonica*).
  Balm-of-gilead (*Abies balsamea*).
  Balsam (*Abies balsamea*,
    Abies concolor).
  Bristlecone (*Abies venusta*).
  California (*Abies magnifica*).
  Colorado Douglas (*Pseudotsuga glauca*).
  Colorado white (*Abies concolor*).
  Corkbark (*Abies arizonica*).
  Lovely (*Abies amabiis*).
Fir—Continued.
  Lowland white (*Abies grandis*).
  Noble (*Abies nobilis*).
  Oregon Douglas (*Pseudotsuga taxifolia*).
  Red (*Abies magnifica*,
    Abies nobilis,
    Pseudotsuga glauca,
    Pseudotsuga taxifolia).
  Santa Lucia (*Abies venusta*).
  Shasta red (*Abies magnifica*).
  Silver (*Abies ambilis*,
    Abies concolor,
    Abies grandis).
  Southern balsam (*Abies fraseri*).
  Stinking (*Abies grandis*).
  White (*Abies grandis*,
    Abies lasiocarpa).
  Yellow (*Abies grandis*,
    Pseudotsuga glauca,
    Pseudotsuga taxifolia).
Fire,
  cherry (*Prunus pennsylvanica*).
  willow (*Salix scouleriana*).
Firecracker plant (*Aesculus pavia*).
Firethorn (*Cotoneaster pyracantha*).
Firmleaf willow (*Salix pseudomyrsinites*).
Flag papaw (*Asimina incana*).
Flame azalea (*Rhododendron calendulaceum*).
Flannelbush (*Fremontia californica*).
Flat sagebrush (*Artemisia bigelovii*).
Flat-top (*Eriogonum fasciculatum*).
Florida,
  mahogany (*Persea borbonia*).
  maple (*Acer floridanum*).
  soapberry (*Sapindus marginatus*).
  yew (*Taxus floridana*).
Flowering,
  ash (*Chionanthus virginica*,
    Fraxinus cuspidata,
    Fraxinus dipetala).
  dogwood (*Cornus florida*,
    Cornus nuttallii).
Flycatcher (*Befaria racemosa*).
Fly honeysuckle, (*Lonicera ciliosa*).
Swamp (*Lonicera oblongifolia*).
Foothill ash (*Fraxinus dipetala*).
Forbes' cypress (*Cupressus guadeloupensis*).
Fox grape (*Vitis labrusca*).
  Northern (*Vitis labrusca*).
  Southern (*Vitis rotundifolia*).
Foxtail pine (*Pinus aristata*,
    Pinus balfouriana).
Fragile willow (*Salix fragilis*).
Fragrant,
  ash (*Fraxinus cuspidata*).
  sumac (*Rhus aromatica*).
Frangipani (*Acacia farnesiana*).
Fraser magnolia (*Magnolia fraseri*).
Fremont,
  barberry (*Berberis fremontii*).
  chaffbush (*Amphipappus fremontii*).
  cottonwood (*Populus fremontii*).

Fremont—Continued.
dalea (*Dalea fremontii*).
desert-thorn (*Lycium fremontii*).
hollygrape (*Berberis fremontii*).
silktassel (*Garrya fremontii*).
wolfberry (*Lycium fremontii*).
Fremontia, California (*Fremontia californica*).
French mulberry (*Callicarpa americana*).
Frijolillo (*Sophora secundiflora*).
Fringetree (*Chionanthus virginica*).
Fringed,
greenbrier (*Smilax bona-nox*).
wormwood (*Artemisia frigida*).
Frost grape (*Vitis cordifolia*,
Vitis vulpina).
Frutilla (*Lycium richii*).
Fuchsia-flowered gooseberry (*Ribes speciosum*).
Gallberry (*Ilex glabra*).
Gambel oak (*Quercus gambelii*).
Gander vine (*Clematis virginiana*).
Garden wild plum (*Prunus hortulana*).
Garland tree (*Malus coronaria*).
Garnet gooseberry (*Ribes speciosum*).
Garrumbullo (*Lycium torreyi*).
Garry oak (*Quercus garryana*).
Georgia,
bark (*Pinckneya pubens*).
buckeye (*Aesculus neglecta*).
gooseberry (*Ribes curvatum*).
hackberry (*Celtis georgiana*).
oak (*Quercus georgiana*).
pine (*Pinus australis*).
sloe (*Prunus mitis*).
Geyer willow (*Salix geyeriana*).
Giant chinquapin (*Castanopsis chrysophylla*).
Gigante (*Nicotiana glauca*).
Glaucous willow (*Salix discolor*).
Globemallow,
Davidson (*Malvastrum davidsonii*).
Nuttall (*Malvastrum nuttallii*).
Goat-nut (*Simmondsia chinensis*).
Goatbrush (*Pachistima myrsinites*).
Goatbush (*Castela nicholsonii*,
Castela texana).
Golden,
currant (*Ribes aureum*,
Ribes odoratum).
hardhack (*Potentilla fruticosa*).
Goldenbush (*Aplopappus acradenius*).
Bloomer (*Aplopappus bloomeri*).
Chaparral (*Aplopappus propinquus*).
Coast (*Aplopappus squarrosus*).
Cooper (*Aplopappus cooperi*).
Dwarf (*Aplopappus nanus*).
Heatherleaf (*Aplopappus ericoides*).
Narrowleaf (*Aplopappus linearifolius*).
Palmer (*Aplopappus palmeri*).
Parish (*Aplopappus parishii*).
Pineleaf (*Aplopappus pinifolius*).
Wedgeleaf (*Aplopappus cuneatus*).
Goldenfleece (*Aplopappus arborescens*).
Goldenhead (*Acamptopappus sphaerocephalus*).
Goldleaf chinquapin (*Castanopsis chrysophylla*,
Castanopsis sempervirens).
Gold heather (*Hudsonia ericoides*).
Goldman serviceberry (*Amelanchier goldmanii*).
Goodding willow (*Salix gooddingii*).
Gooseberry,
Alpine (*Ribes lepthanthum*).
Canyon (*Ribes menziesii*).
Cloud-cap (*Ribes montigenum*).
Fuchsia-flowered (*Ribes speciosum*).
Garnet (*Ribes speciosum*).
Georgia (*Ribes curvatum*).
Granite (*Ribes curvatum*).
Gummy (*Ribes lobbii*).
Hawthorn (*Ribes oxyacanthoides*).
Hill (*Ribes californicum*).
Hupa (*Ribes marshallii*).
Island (*Ribes viburnifolium*).
Low wild (*Ribes hirtellum*).
Lucia (*Ribes sericeum*).
Menzies (*Ribes menziesii*).
Missouri (*Ribes missouriense*,
Ribes setosum).
Mountain (*Ribes montigenum*,
Ribes rotundifolium).
Northern (*Ribes oxyacanthoides*).
Orange (*Ribes pinetorum*).
Oregon (*Ribes lobbii*).
Pasture (*Ribes cynosbatii*).
Prickly (*Ribes cynosbatii*).
Rock (*Ribes quercetorum*).
Round (*Ribes rotundifolium*).
Sierra (*Ribes roezlii*).
Smooth (*Ribes oxyacanthoides*,
Ribes rotundifolium).
Southern (*Vaccinium melanocarpum*).
Straggly (*Ribes divaricatum*).
Swamp (*Ribes lacustre*).
Watson (*Ribes watsonianum*).
White (*Ribes inerme*).
Whitestem (*Ribes inerme*).
Wine (*Ribes inerme*).
Gooseberry currant (*Ribes montigenum*).
Gopher berry (*Gaylussacia dumosa*).
Gopher-wood (*Cladrastis lutea*).
Gorse (*Ulex europaeus*).
Gowen cypress (*Cupressus goveniana*).
Granite-gooseberry (*Ribes curvatum*).
Granjeno (*Celtis pallida*).
Grape,
Adobe-land (*Vitis champinii*).
Arizona (*Vitis arizonica*).
Arroyo (*Vitis vulpina*).
Ashy (*Vitis cinerea*).
Bailey (*Vitis baileyana*).
Big summer (*Vitis lincecumii*).
Blueleaf (*Vitis argentifolia*).
Bull (*Vitis rotundifolia*).

- Grape—Continued.
  - Bullace (*Vitis rotundifolia*).
  - Bullet (*Vitis rotundifolia*).
  - Bush (*Vitis longii*).
  - Calcaire (*Vitis champinii*).
  - California (*Vitis californica*).
  - California wild (*Vitis californica*).
  - Canyon (*Vitis arizonica*).
  - Cat (*Vitis palmata*).
  - Catbird (*Vitis palmata*).
  - Champin (*Vitis champinii*).
  - Chicken (*Vitis cordifolia*).
  - Currant (*Vitis simpsonii*).
  - Curtiss (*Vitis sola*).
  - Desert (*Vitis girdiana*).
  - Doan (*Vitis doaniana*).
  - Downy (*Vitis cinerea*).
  - Fall (*Vitis berlandieri*).
  - Fox (*Vitis labrusca*).
  - Frost (*Vitis cordifolia*, *Vitis vulpina*).
  - Gulch (*Vitis longii*, *Vitis treleasei*).
  - Little mountain (*Vitis berlandieri*).
  - Little muscadine (*Vitis munsoniana*).
  - Missouri (*Vitis palmata*).
  - Mountain (*Berberis aquifolium*, *Vitis berlandieri*, *Vitis rupestris*).
  - Muscadine (*Vitis rotundifolia*).
  - Mustang (*Vitis candicans*).
  - Northern fox (*Vitis labrusca*).
  - Oregon (*Berberis aquifolium*, *Berberis nervosa*, *Berberis repens*).
  - Pacific (*Vitis californica*).
  - Panhandle (*Vitis doaniana*).
  - Pilgrim (*Vitis novae-angliae*).
  - Plum (*Vitis labrusca*).
  - Possum (*Vitis baileyana*).
  - Post-oak (*Vitis lincecumii*).
  - Red (*Vitis palmata*).
  - Redshank (*Vitis rufotomentosa*).
  - Riverbank (*Vitis vulpina*).
  - Rock (*Vitis rupestris*).
  - Roundleaf (*Vitis helleri*).
  - Sand (*Vitis lincecumii*, *Vitis rupestris*).
  - Solonis (*Vitis longii*).
  - Southern fox (*Vitis rotundifolia*).
  - Spanish (*Vitis berlandieri*).
  - Sugar (*Vitis monticola*, *Vitis rupestris*).
  - Summer (*Vitis argentifolia*).
  - Sweet mountain (*Vitis monticola*).
  - Sweet winter (*Vitis cinerea*).
  - Turkey (*Vitis lincecumii*).
  - Western wild (*Vitis californica*).
  - Wild (*Vitis girdiana*).
  - Winter (*Vitis cordifolia*, *Vitis berlandieri*).
- Grape honeysuckle (*Lonicera prolifera*).
- Grave's oak (*Quercus gravesii*).
- Gray,
  - beard (*Hydrangea quercifolia*).
- Gray—Continued.
  - birch (*Betula lutea*, *Betula populifolia*).
  - dogwood (*Cornus paniculata*).
  - elm (*Ulmus americana*).
  - horsebrush (*Tetradymia canescens*).
  - oak (*Quercus grisea*).
  - pine (*Pinus banksiana*).
  - willow, dwarf (*Salix tristis*).
- Gray-stemmed dogwood (*Cornus paniculata*).
- Greasebush (*Forsellesia spinescens*).
  - Dwarf (*Forsellesia pungens*).
  - Spiny (*Forsellesia spinescens*).
- Grease-thorn (*Forsellesia spinescens*).
- Greasewood (*Adenostoma fasciculatum*, *Ceanothus velutinus*, *Covillea tridentata*, *Sarcobatus vermiculatus*).
- Great,
  - laurel (*Rhododendron maximum*).
  - whortleberry (*Vaccinium corymbosum*).
- Great-berried manzanita (*Arctostaphylos glauca*).
- Great-leaved magnolia (*Magnolia macrophylla*).
- Green,
  - alder (*Alnus crispa*).
  - locust (*Robinia pseudoacacia*).
  - osier (*Cornus alternifolia*).
- Greenbark ceanothus (*Ceanothus spinosus*).
- Green-barked acacia (*Cercidium floridum*, *Cercidium torreyanum*).
- Greenbrier,
  - Bristly (*Smilax auriculata*, *Smilax hispida*).
  - California (*Smilax californica*).
  - Common (*Smilax rotundifolia*).
  - Coral (*Smilax lanceolata*, *Smilax walteri*).
  - Fringed (*Smilax bona-nox*).
  - Laurel (*Smilax laurifolia*).
  - Long-stalked (*Smilax pseudo-china*).
- Greene mountain-ash (*Sorbus scopulina*).
- Greenleaf manzanita (*Arctostaphylos patula*).
- Greensides willow (*Salix monochroma*).
- Greenweed, dyers (*Genista tinctoria*).
- Gregg,
  - ceanothus (*Ceanothus greggii*).
  - hornbrush (*Ceanothus greggii*).
  - lead tree (*Leucaena greggii*).
  - sage (*Salvia greggii*).
- Ground,
  - hemlock (*Taxus canadensis*).
  - gooseberry (*Ribes binominatum*).
- Groundsel tree (*Baccharis halimifolia*).
- Grouse whortleberry (*Vaccinium scoparium*).

- Grouseberry (*Gaultheria procumbens, Vaccinium scoparium*).
- Guadeloupe cypress (*Cupressus guadeloupensis*).
- Guajillo (*Acacia berlandieri*).
- Guard lupine (*Lupinus excubitus*).
- Guayacan (*Porlieria angustifolia*).
- Gulf,
  - guajillo (*Pithecolobium brevifolium*).
  - willow (*Salix nigra*).
- Gum,
  - Black (*Nyssa sylvatica*).
  - Cotton (*Nyssa aquatica*).
  - Highland black (*Nyssa sylvatica*).
  - Large tupelo (*Nyssa aquatica*).
  - Sour (*Nyssa sylvatica*).
  - Sour tupelo (*Nyssa ogeche*).
  - Southern black (*Nyssa biflora*).
  - Swamp black (*Nyssa biflora*).
  - Tupelo (*Nyssa aquatica*).
  - Water (*Nyssa biflora*).
- Gum elastic (*Bumelia lanuginosa*).
- Gummy gooseberry (*Ribes lobbii*).
- Hackberry (*Celtis occidentalis*).
  - Desert (*Celtis pallida*).
  - Douglas (*Celtis douglasii*).
  - Georgia (*Celtis georgiana*).
  - Small's (*Celtis smallii*).
  - Southern (*Celtis mississippiensis*).
  - Spiny (*Celtis pallida*).
  - Thick-leaved (*Celtis reticulata*).
  - Western (*Celtis reticulata*).
- Hackmatack (*Larix laricina*).
- Hagbrier (*Smilax hispida*).
- Hairy,
  - ceanothus (*Ceanothus oliganthus*).
  - honeysuckle (*Lonicera hirsuta*).
  - horsebrush (*Tetradymia comosa*).
  - huckleberry (*Vaccinium hirsutum*).
  - manzanita (*Arctostaphylos columbiana*).
  - nanny-berry (*Viburnum pubescens*).
- Harbison willow (*Salix harbisonii*).
- Hardhack (*Spiraea douglasii, Spiraea tomentosa*).
- Hard maple (*Acer saccharum*).
- Hardtack, (*Cercocarpus betuloides*).
  - California (*Cercocarpus betuloides*).
  - Catalina (*Cercocarpus traskiae*).
  - Mesa (*Cercocarpus minutiflorus*).
- Havard shinnery oak (*Quercus havardii*).
- Haw (*Viburnum prunifolium*).
  - Black (*Bumelia lanuginosa, Bumelia tenax, Viburnum prunifolium*).
  - Possum (*Ilex decidua, Viburnum nudum*).
  - Purple (*Condalia obovata*).
  - Southern black (*Viburnum rufidulum*).
  - Swamp (*Viburnum cassinoides, Viburnum nudum*).
  - Sweet (*Viburnum prunifolium*).
  - Western black (*Viburnum ellipticum*.)
- Hawthorn (*Crataegus* spp.)
  - gooseberry (*Ribes oxyacanthoides*).
- Hazel, wild (*Simmondsia chinensis*).
- Hazel alder (*Alnus rugosa*).
- Hazelnut,
  - American (*Corylus americana*).
  - Beaked (*Corylus rostrata*).
- Heartleaf,
  - ampelopsis (*Cissus ampelopsis*).
  - manzanita (*Arctostaphylos andersonii*).
  - pentstemon (*Pentstemon cordifolius*).
  - willow (*Salix cordata*).
- Heartnut (*Krameria glandulosa*).
- Heath cliffrose (*Cowania ericaefolia*).
- Heather,
  - Beach (*Hudsonia tomentosa*).
  - Gold (*Hudsonia ericoides*).
  - Mountain (*Phyllodoce caerulea*).
  - Red (*Phyllodoce breweri, Phyllodoce empetriformis*).
  - Yellow (*Phyllodoce glanduliflora*).
- Heatherleaf goldenbush (*Aplopappus ericoides*).
- Hedge (*Maclura pomifera*).
- Hedgehog oak (*Lithocarpus densiflora*).
- Hediondilla (*Covillea tridentata*).
- Hediondo (*Covillea tridentata*).
- He-huckleberry (*Cyrilla racemiflora*).
- Hellefetter (*Smilax hispida*).
- Hell-vine (*Campsis radicans*).
- Hemlock (*Tsuga canadensis*).
  - Canada (*Tsuga canadensis*).
  - Carolina (*Tsuga caroliniana*).
  - Eastern (*Tsuga canadensis*).
  - Ground (*Taxus canadensis*).
  - Mountain (*Tsuga mertensiana*).
  - Western (*Tsuga heterophylla*).
- Hemlock spruce (*Tsuga canadensis*).
- Hercules-club (*Aralia spinosa, Xanthoxylum clava-herculis*).
- Hickory,
  - Big-bud (*Carya alba*).
  - Big shellbark (*Carya laciniosa*).
  - Bigleaf shagbark (*Carya laciniosa*).
  - Bitternut (*Carya cordiformis, Carya glabra*).
  - Black (*Carya alba, Carya glabra*).
  - Bottom (*Carya carolinae-septentrionalis*).
  - Bullnut (*Carya alba*).
  - Hognut (*Carya alba*).
  - King nut (*Carya laciniosa*).
  - Little shagbark (*Carya microcarpa*).
  - Littlenut shagbark (*Carya microcarpa*).
  - Lowland (*Carya aquatica*).
  - Mockernut (*Carya alba*).
  - Nutmeg (*Carya myristicaeformis*).
  - Pignut (*Carya cordiformis, Carya glabra, Carya leiodermis,*

- Hickory—Continued.
  - Pignut—Continued.
    Carya pallida,
    Carya villosa).
  - Scrub (*Carya floridana*).
  - Shagbark (*Carya ovata*).
  - Shellbark (*Carya ovata*).
  - Small-fruited (*Carya microcarpa*).
  - Small pignut (*Carya ovalis*).
  - Southern shagbark (*Carya carolinae-septentrionalis*).
  - Swamp (*Carya cordiformis*).
  - Texas (*Carya buckleyi*).
  - Water (*Carya aquatica*).
  - White (*Carya alba*).
  - Whiteheart (*Carya alba*).
- Hickory,
  - pine (*Pinus aristata*).
  - poplar (*Liriodendron tulipifera*).
- Highbush,
  - blueberry (*Vaccinium corymbosum*).
  - cranberry (*Viburnum trilobum*).
- Highland,
  - black gum (*Nyssa sylvatica*).
  - live oak (*Quercus wislizenii*).
- Hill,
  - gooseberry (*Ribes californicum*).
  - oak (*Quercus douglasii*).
- Hillside gooseberry (*Ribes californicum*).
- Hinds walnut (*Juglans hindsii*).
- Hoary,
  - alder (*Alnus incana*).
  - azalea (*Rhododendron canescens*).
  - sagebrush (*Artemisia cana*).
  - willow (*Salix candida*).
- Hoary-leaf ceanothus (*Ceanothus crassifolius*).
- Hobblebush (*Viburnum alnifolium*).
- Hog plum (*Prunus reverchonii,*
  Colubrina texensis,
  Prunus umbellata).
- Hognut hickory (*Carya alba*).
- Holly,
  - American (*Ilex opaca*).
  - Bearberry (*Ilex decidua*).
  - Christmas (*Ilex opaca*).
  - Deciduous (*Ilex decidua*).
  - Largeleaf (*Ilex longipes*).
  - Large-leaved (*Nemopanthus mucronata*).
  - Michigan (*Ilex verticillata*).
  - Mountain (*Ilex montana,*
    Nemopanthus mucronata).
- Holly oak (*Quercus undulata*).
- Hollybush (*Tetracoccus ilicifolius*).
- Hollygrape,
  - California (*Berberis californicum*).
  - Creeping (*Berberis repens*).
  - Dwarf (*Berberis repens*).
  - Fremont (*Berberis fremontii*).
  - Netleaf (*Berberis californicum*).
  - Nevin (*Berberis nevinii*).
  - Oregon (*Berberis aquifolium,*
    Berberis nervosa).
- Hollygrape—Continued.
  - Red (*Berberis haematocarpa*).
  - Veinyleaf (*Berberis nervosa*).
  - Wavyleaf (*Berberis pinnata*).
- Hollyleaf,
  - buckthorn (*Rhamnus crocea*).
  - bur-sage (*Franseria ilicifolia*).
  - ceanothus (*Ceanothus jepsonii*).
  - cherry (*Prunus ilicifolia*).
- Hollyscale (*Atriplex hymenelytra*).
- Honey,
  - mesquite (*Prosopis chilensis*).
  - shucks (*Gleditsia triacanthos*).
- Honeylocust (*Gleditsia triacanthos,*
  Prosopis glandulosa,
  Prosopis chilensis,
  Robini pseudoacacia).
- Honeysuckle (*Lonicera ciliosa,*
  Rhododendron canescens).
  - American fly (*Lonicera canadensis*).
  - Arizona (*Lonicera arizonica*).
  - Bearberry (*Lonicera involucrata*).
  - Blue fly (*Lonicera villosa*).
  - Bush (*Diervilla lonicera*).
  - Chaparral (*Lonicera interrupta*).
  - Coral (*Lonicera sempervirens*).
  - Douglas (*Lonicera glaucescens*).
  - Fly (*Lonicera ciliosa*).
  - Grape (*Lonicera prolifera*).
  - Hairy (*Lonicera hirsuta*).
  - Japanese (*Lonicera japonica*).
  - Mountain (*Lonicera dioica*).
  - Mountain fly (*Lonicera cauriana,*
    Lonicera villosa).
  - Orange (*Lonicera ciliosa*).
  - Pink (*Lonicera hispidula*).
  - Swamp fly (*Lonicera oblongifolia*).
  - Trumpet (*Lonicera sempervirens*).
  - Twinberry (*Lonicera involucrata*).
  - Utah (*Lonicera utahensis*).
  - Yellow (*Lonicera flava*).
- Hoop ash (*Fraxinus nigra*).
- Hopbush (*Dodonaea arizonica*).
- Hophornbeam, (*Ostrya virginiana*).
  - Bailey (*Ostrya baileyi*).
  - Western (*Ostrya knowltonii*).
- Hop-sage,
  - Spineless (*Grayia brandegei*).
  - Spiny (*Grayia spinosa*).
- Hoptree (*Ptelea trifoliata*).
- Hornbeam, (*Carpinus caroliniana*).
  - Bailey hop (*Ostrya baileyi*).
  - Western hop (*Ostrya knowltonii*).
- Horse,
  - plum (*Prunus americana,*
    Prunus nigra).
  - sugar (*Symplocos tinctoria*).
- Horsebean, (*Parkinsonian aculeata*).
  - Little-leaf (*Parkinsonia microphylla*).
  - Small-leaved (*Parkinsonia microphylla*).
- Horsebrier (*Smilax rotundifolia*).

- Horsebrush (*Partheneium incanum*).
  - Gray (*Tetradymia canescens*).
  - Hairy (*Tetradymia comosa*).
  - Littleleaf (*Tetradymia glabrata*).
  - Longspine (*Tetradymia spinosa*).
  - Mohave (*Tetradymia stenolepis*).
  - Nuttall (*Tetradymia nuttallii*).
  - Shortspine (*Tetradymia spinosa*).
- Hortulan plum (*Prunus hortulana*).
- Huajillo (*Pithecolobium brevifolium*).
- Huckleberry,
  - Bear (*Gaylussacia ursina*).
  - Black (*Gaylussacia baccata*).
  - Box (*Gaylussacia brachycera*).
  - California (*Vaccinium ovatum*).
  - Dwarf (*Gaylussacia dumosa*).
  - Dwarf red (*Vaccinium scoparium*).
  - Evergreen (*Vaccinium ovatum*).
  - Hairy (*Vaccinium hirsutum*).
  - Lowbush (*Vaccinium vacillans*).
  - Red (*Vaccinium parvifolium*).
  - Squaw (*Vaccinium stamineum*).
  - Tall red (*Vaccinium parvifolium*).
  - Thinleaf (*Vaccinium membranaceum*).
  - Tree (*Vaccinium arboreum*).
  - Western (*Vaccinium occidentale*).
- Huckleberry oak (*Quercus vaccinifolia*).
- Hudson Bay currant (*Ribes hudsonianum*).
- Huisache (*Acacia farnesiana*).
- Huisachillo (*Acacia tortuosa*).
- Hupa gooseberry (*Ribes marshallii*).
- Hydrangea,
  - Ashy (*Hydrangea cinerea*).
  - Climbing (*Decumaria barbara*).
  - Mountain (*Hydrangea arborescens*).
  - Oakleaf (*Hydrangear quercifolia*).
  - Silverleaf (*Hydrangea radiata*).
  - Smooth (*Hydrangea arborescens*).
  - Snowy (*Hydrangea radiata*).
  - Wild (*Hydrangea arborescens*).
- Incense cedar (*Libocedrus decurrens*).
- Indigo,
  - False (*Amorpha fruticosa*).
  - Mountain (*Amorpha glabra, Amorpha virgata*).
  - Schwerin's (*Amorpha schwerinii*).
  - Tennessee (*Amorpha tennesseensis*).
- Indigobush, (*Amorpha fruticosa, Dalea spinosa*).
  - California (*Amorpha californica*).
  - Dwarf (*Amorpha microphylla*).
- Indian,
  - cherry (*Rhamnus caroliniana*).
  - currant (*Symphoricarpos orbiculatus*).
  - plum (*Osmaronia cerasiformis*).
- Inkberry, (*Ilex glabra, Ilex verticillata*).
  - tall (*Ilex coriacea*).
- Inkweed (*Allenrolfea occidentalis*).
- Inland Jersey-tea (*Ceanothus ovatus*).
- Interior live oak (*Quercus wislizenii*).
- Iodine bush (*Allenrolfea occidentalis*).
- Ione bush (*Ceanothus tomentosus*).
- Iowa crab apple (*Malus ioensis*).
- Iron oak (*Quercus chrysolepis, Quercus stellata*).
- Ironwood, (*Bumelia lycioides, Bumelia tenax, Carpinus caroliniana, Cliftonia monophylla, Ostrya knowltonii, Ostrya virginiana, Prosopis chilensis*).
  - Catalina (*Lyonothamnus floribundus*).
  - Santa Cruz (*Lyonothamnus floribundus*).
  - Swamp (*Cyrilla racemiflora*).
- Island,
  - ceanothus (*Ceanothus arboreus*).
  - cherry (*Prunus lyonii*).
  - gooseberry (*Ribes viburnifolium*).
  - live oak (*Quercus tomentella*).
  - myrtle (*Ceanothus arboreus*).
- Islay (*Prunus ilicifolia*).
- Ivy, (*Kalmia latifolia, Leucothoë catesbaei*).
  - American (*Parthenocissus quinquefolia*).
  - Marine (*Cissus incisa*).
  - Sevenleaf (*Parthenocissus heptaphylla*).
- Jack,
  - oak (*Quercus ellipsoidalis, Quercus marilandica*).
  - pine (*Pinus banksiana*).
- Japanese honeysuckle (*Lonicera japonica*).
- Jara (*Baccharis glutinosa*).
  - dulce (*Baccharis glutinosa*).
- Javelin brush (*Microrhamnus ericoides*).
- Jeffrey pine (*Pinus jeffreyi*).
- Jepson ceanothus (*Ceanothus jepsonii*).
- Jersey pine (*Pinus virginiana*).
- Jerusalem-thorn (*Parkinsonia aculeata*).
- Jessamine,
  - False (*Gelsemium sempervirens*).
  - Yellow (*Gelsemium sempervirens*).
- Jim brush (*Ceanothus sorediatus*).
- Jointfir,
  - California (*Ephedra californica*).
  - Nevada (*Ephedra nevadensis*).
  - Texas (*Ephedra texana*).
  - Torrey (*Ephedra torreyana*).
- Jojoba (*Simmondsia chinensis*).
- Joshua tree (*Yucca brevifolia*).
- Judas-tree (*Cercis canadensis*).
- Julibrissin (*Albizzia julubrissin*).
- Juneberry, (*Amelanchier canadensis*).
  - Low (*Amelanchier humilis, Amelanchier stolonifera*).
- Junebud (*Cercis canadensis*).
- Juniper,
  - Alligator (*Juniperus pachyphloea*).
  - Big berry (*Juniperus megalocarpa*).

- Juniper—Continued.
  - California (*Juniperus californica*).
  - Coast (*Juniperus lucayana*).
  - Colorado (*Juniperus scopulorum*).
  - Dwarf (*Juniperus communis*).
  - One-seed (*Juniperus monosperma*).
  - Pinchot (*Juniperus pinchotii*).
  - Red-berry (*Juniperus pinchotii*).
  - Red-fruited (*Juniperus erythrocarpa*).
  - Utah (*Juniperus utahensis*).
  - Western (*Juniperus occidentalis*).
- Kentucky,
  - coffeetree (*Gymnocladus dioica*).
  - viburnum (*Viburnum molle*).
  - wisteria (*Wisteria macrostachya*).
  - yellow wood (*Cladrastis lutea*).
- Kern ceanothus (*Ceanothus pinetorum*).
- Kidneywood (*Eysenhardtia polystachya*).
- Kidneywort (*Baccharis pilularis*).
- King nut hickory (*Carya laciniosa*).
- Kinnikinnik (*Arctostaphylus uva-ursi*, *Cornus amomum*).
- Klamath plum (*Prunus subcordata*).
- Knackaway (*Ehretia anacua*).
- Knobcone pine (*Pinus attenuata*).
- Labrador,
  - tea (*Ledum groenlandicum*).
  - tea, smooth (*Ledum glandulosum*).
  - willow (*Salix argyrocarpa*).
- Labrusca (*Vitis labrusca*).
- Lacey oak (*Quercus breviloba*).
- Lady-bloom (*Ceanothus parryi*).
- Lady-bush (*Ceanothus parryi*).
- Lambkill (*Kalmia angustifolia*).
- Lanceleaf,
  - alder (*Alnus oblongifolia*).
  - cottonwood (*Populus acuminata*).
  - crab apple (*Malus lancifolia*).
- Lance-leaved buckthorn (*Rhamnus lanceolata*).
- Lantana (*Lantana camara*).
  - White flowered (*Lantana involucrata*).
- Lapland,
  - rhododendron (*Rhododendron lapponicum*).
  - rose bay (*Rhododendron lapponicum*).
- Larch (*Larix laricina*, *Larix lyallii*, *Larix occidentalis*).
  - American (*Larix laricina*).
  - Alpine (*Larix lyallii*).
  - Western (*Larix occidentalis*).
- Large,
  - buckeye (*Aesculus octandra*).
  - tupelo gum (*Nyssa aquatica*).
- Largeleaf holly (*Ilex longipes*).
- Largetooth aspen (*Populus grandidentata*).
- Large-leaved,
  - cucumbertree (*Magnolia macrophylla*).
- Large-leaved—Continued.
  - holly (*Nemopanthus mucronata*).
  - umbrella-tree (*Magnolia macrophylla*).
- Laurel,
  - Big (*Magnolia grandiflora*).
  - Black (*Gordonia lasianthus*, *Leucothaë davisiae*).
  - California (*Umbellularia californica*).
  - Carolina cherry (*Prunus caroliniana*).
  - Mountain (*Kalmia latifolia*).
  - Narrow-leaved (*Kalmia angustifolia*).
  - Pale (*Kalmia polifolia*).
  - Sheep (*Kalmia angustifolia*).
  - Sticky (*Ceanothus velutinus*).
  - Swamp (*Kalmia polifolia*, *Magnolia virginiana*).
  - Sweet (*Illicium floridanum*).
- Laurel,
  - cherry (*Prunus caroliniana*).
  - greenbrier (*Smilax laurifolia*).
  - oak (*Quercus imbricaria*, *Quercus laurifolia*, *Quercus phellos*).
  - sumac (*Rhus laurina*).
  - tree (*Persea borbonia*).
- Lavender, desert (*Hyptis emoryi*).
- Lawson cypress (*Chamaecyparis lawsoniana*).
- Leadplant (*Amorpha canescens*).
- Leather oak (*Quercus dumosa*).
- Leatherbark (*Dirca palustris*).
- Leatherleaf ash (*Fraxinus velutina*).
- Leatherwood (*Cyrilla racemiflora*, *Dirca palustris*).
  - Mountain (*Fremontia californica*).
  - Western (*Dirca occidentalis*).
- Leatherflower (*Clematis viorna*).
- Leatherleaf (*Chamaedaphne calyculata*).
- Lemmon,
  - acacia (*Acacia lemmonii*).
  - willow (*Salix lemmonii*).
- Lemonade,
  - berry (*Rhus integrifolia*).
  - sumac (*Rhus trilobata*).
- Lenscale (*Atriplex lentiformis*).
- Lentisco (*Rhus integrifolia*).
- Leverwood (*Ostrya virginiana*).
- Limber pine (*Pinus flexilis*).
- Lime-tree (*Tilia glabra*).
- Linden (*Tilia glabra*).
  - American (*Tilia glabra*).
- Linn (*Tilia glabra*).
- Liquidambar (*Liquidambar styraciflua*).
- Little,
  - mountain grape (*Vitis berlandieri*).
  - muscadine grape (*Vitis munsoniana*).
  - pignut hickory (*Carya microcarpa*).
  - sage (*Artemisia nova*).
  - shagbark hickory (*Carya microcarpa*).

- Little—Continued.
  - silverbell (*Halesia parviflora*).
  - walnut (*Juglans rupestris*).
  - witch-hazel (*Hamamelis vernalis*).
- Littleleaf,
  - ash (*Fraxinus greggii*).
  - brickellbush (*Brickellia microphylla*).
  - ceanothus (*Ceanothus parvifolius*).
  - cherry (*Prunus minutiflora*).
  - horsebean (*Parkinsonia microphylla*).
  - horsebrush (*Tetradymia glabrata*).
- Littlenut shagbark hickory (*Carya microcarpa*).
- Live oak (*Quercus virginiana*).
- Loblolly,
  - bay (*Gordonia lasianthus*).
  - pine (*Pinus taeda*).
- Locust,
  - Black (*Gleditsia triacanthos, Robinia pseudoacacia*).
  - Brostly (*Robinia hispida*).
  - Clammy (*Robinia viscosa*).
  - Green (*Robinia pseudoacacia*).
  - Honey (*Gleditsia triacanthos, Prosopis glandulosa, Prosopis chilensis, Robinia pseudoacacia*).
  - Mock (*Amorpha californica*).
  - New Mexico (*Robinia neomexicana*).
  - Peaflower (*Robinia pseudoacacia*).
  - Post (*Robinia peudoacacia*).
  - Red (*Robinia pseudoacacia*).
  - Shipmast (*Robinia pseudoacacia*).
  - Water (*Gleditsia aquatica*)·
  - White (*Robinia pseudoacacia*).
  - Yellow (*Cladrastis lutea, Robinia pseudoacacia*).
- Lodgepole pine (*Pinus contorta, Pinus murrayana*).
- Logwood (*Condalia obovata*).
- Long monkeyflower (*Mimulus longiflorus*).
- Long-flowered catclaw (*Acacia greggii*).
- Longleaf,
  - pine (*Pinus australis*).
  - willow (*Salix fluviatilis, Salix interior*).
- Long-leaved cucumbertree (*Magnolia fraseri*).
- Longspine horsebrush (*Tetradymia spinosa*).
- Long-stalked greenbrier (*Smilax pseudochina*).
- Lotebush (*Condalia lycioides, Condalia obtusifolia*).
- Lovely fir (*Abies amabilis*).
- Low,
  - asimina (*Asimina pygmaea*).
  - birch (*Betula pumila*).
  - blueberry (*Vaccinium vacillans*).
  - juneberry (*Amelanchier humilis, Amelanchier stolonifera*).
  - sagebrush (*Artemisia arbuscula*).
  - sweet blueberry (*Vaccinium angustifolium*).
  - wild gooseberry (*Ribes hirtellum*).
- Lowbush,
  - blueberry (*Vaccinium angustifolium*).
  - huckleberry (*Vaccinium vacillans*).
- Lowland,
  - hickory (*Carya aquatica*).
  - white fir (*Abies grandis*).
- Lucia gooseberry (*Ribes sericeum*).
- Lupine,
  - Chamisso (*Lupinus chamissonis*).
  - Dune (*Lupinus chamissonis*).
  - Guard (*Lupinus excubitus*).
  - Mat (*Lupinus breweri*).
  - Silver (*Lupinus albifrons*).
  - Tree (*Lupinus arboreus*).
- Lyall willow (*Salix lasiandra*).
- Lyonia-vine (*Calycocarpum lyonii*).
- MacDonald oak (*Quercus dumosa*).
- MacDougal oak (*Quercus pauciloba*).
- Mackenzie willow (*Salix mackenziana*).
- Macnab cypress (*Cupressus macnabiana*).
- Madrone (*Arbutus menziesii*).
  - Arizona (*Arbutus arizonica*).
  - Texas (*Arbutus texana*).
- Magnolia,
  - Ashe (*Magnolia ashei*).
  - Bigleaf (*Magnolia macrophylla*).
  - Cucumber (*Magnolia acuminata*).
  - Evergreen (*Magnolia grandiflora*).
  - Fraser (*Magnolia fraseri*).
  - Great-leaved (*Magnolia macrophylla*).
  - Mountain (*Magnolia acuminata, Magnolia fraseri, Magnolia pyramidata*).
  - Pyramid (*Magnolia pyramidata*).
  - Southern (*Magnolia grandiflora*).
  - Swamp (*Magnolia virginiana*).
  - Sweet (*Magnolia virginiana*).
  - Umbrella (*Magnolia tripetala*).
  - Yellow-flower (*Magnolia cordata*).
- Mahala mat (*Ceanothus prostratus*).
- Mahaleb cherry (*Prunus mechaleb*).
- Mahogany,
  - Alderleaf mountain (*Cercocarpus alnifolius*).
  - Arizona mountain (*Cercocarpus arizonicus*).
  - Bigleaf mountain (*Cercocarpus traskiae*).
  - Birchleaf (*Cercocarpus montanus*).
  - Birchleaf mountain (*Cercocarpus betuloides*).
  - Curlleaf mountain (*Cercocarpus ledifolius*).
  - Desert (*Cercocarpus ledifolius*).
  - Mountain (*Cercocarpus montanus*).
  - Silver mountain (*Cercocarpus argenteus*).
  - Small-flowered mountain (*Cercocarpus minutiflorus*).
  - Small-leaf (*Cercocarpus intricatus*).
  - Trask (*Cercocarpus traskiae*).

- Mahogany—Continued.
  - birch (*Betula lenta*).
  - sumac (*Rhus integrifolia*).
- Male,
  - berry (*Xolisma ligustrina*).
  - paloverde (*Parkinsonia microphylla*).
- Mallow ninebark (*Physocarpus malvaceus*,
- Malva rosa (*Lavatera assurgentiflora*).
- Mangla (*Rhus laurina*).
- Manzanita,
  - Anderson (*Arctostaphylos andersonii*).
  - Common (*Arctostaphylos manzanita*).
  - Eastwood (*Arctostaphylos glandulosa*).
  - Great-berried (*Arctostaphylos glauca*).
  - Greenleaf (*Arctostaphylos patula*).
  - Hairy (*Arctostaphylos columbiana*).
  - Heartleaf (*Arctostaphylos andersonii*).
  - Mariposa (*Arctostaphylos mariposa*).
  - Parry (*Arctostaphylos manzanita*).
  - Pine-mat (*Arctostaphylos nevadensis*).
  - Pointleaf (*Arctostaphylos pungens*).
  - Roughleaf (*Arctostaphylos drupacea*).
  - Sandmat (*Arctostaphylos pumila*).
  - Whiteleaf (*Arctostaphylos viscida*).
- Maple,
  - Ash-leaved (*Acer negundo*).
  - Bigleaf (*Acer macrophyllum*).
  - Bigtooth (*Acer grandidentatum*).
  - Black (*Acer nigrum*,
Acer saccharum).
  - Black sugar (*Acer nigrum*).
  - Broadleaf (*Acer macrophyllum*).
  - Chalk (*Acer leucoderme*).
  - Dwarf (*Acer glabrum*).
  - Florida (*Acer floridanum*).
  - Hard (*Acer saccharum*).
  - Mountain (*Acer glabrum*,
Acer spicatum).
  - Oregon (*Acer macrophyllum*).
  - Red (*Acer rubrum*).
  - River (*Acer saccharinum*).
  - Rock (*Acer saccharum*).
  - Sierra (*Acer glabrum*).
  - Silver (*Acer saccharinum*).
  - Soft (*Acer rubrum*,
Acer saccharinum).
  - Southern sugar (*Acer floridanum*).
  - Sugar (*Acer saccharum*).
  - Swamp (*Acer rubrum*).
  - Vine (*Acer circinatum*).
  - Water (*Acer rubrum*).
  - Western sugar (*Acer grandidentatum*).
  - White (*Acer saccharinum*).
  - Whitebark (*Acer leucoderme*).
- Mapleleaf,
  - arrowwood (*Viburnum acerifolium*).
  - viburnum (*Viburnum acerifolium*).
- Marine ivy (*Cissus incisa*).
- Mariola (*Parthenium incanum*).
- Mariposa manzanita (*Arctostaphylos mariposa*).
- Marsh pine (*Pinus serotina*).
- Martin,
  - ceanothus (*Ceanothus martinii*).
  - soapbloom (*Ceanothus martinii*).
- Mat,
  - Mahala (*Ceanothus prostratus*).
  - Squaw (*Ceanothus prostratus*).
- Mat lupine (*Lupinus breweri*).
- Matrimony-vine (*Lycium halimifolium*).
- Maul oak (*Quercus chrysolepis*).
- Mayapple (*Malvaviscus drummondii*).
- Maycherry (*Amelanchier canadensis*).
- Mayplum (*Prunus texana*).
- Mazzard (*Prunus avium*).
- Meadow,
  - queen (*Spiraea latifolia*).
  - spiraea (*Spiraea alba*).
  - sweet (*Spiraea alba*,
Spiraea latifolia,
Spiraea salicifolia).
- Mearn's mockorange (*Philadelphus mearnsii*).
- Medaddy-bush (*Lonicera canadensis*).
- Mendocino whitethorn (*Ceanothus incanus*).
- Menodora (*Menodora spinescens*).
- Menzies,
  - gooseberry (*Ribes menziesii*).
  - spiraea (*Spiraea menziesii*).
- Mesa,
  - dalea (*Dalea schottii*).
  - hard-tack (*Cercocarpus minutiflorus*).
  - oak (*Quercus engelmannii*).
- Mescalbean (*Sophora secundiflora*).
- Mescat acacia (*Acacia constricta*).
- Mesquite, (*Prosopis chilensis*).
  - Arizona (*Prosopis chilensis*).
  - Dwarf (*Acacia reticulata*).
  - False (*Calliandra eriophylla*).
  - Honey (*Prosopis chilensis*).
  - Mock (*Calliandra eriophylla*).
  - Screwpod (*Prosopis pubescens*).
  - Velvet (*Prosopis odorata*).
- Mexican,
  - alder (*Alnus oblongifolia*).
  - ash (*Fraxinus berlandieriana*).
  - blue oak (*Quercus oblongifolia*).
  - bluewood (*Condalia mexicana*).
  - buckeye (*Ungnadia speciosa*).
  - cherry (*Prunus mexicana*).
  - elder (*Sambucus mexicana*).
  - lead tree (*Leucaena pulverulenta*).
  - mulberry (*Morus microphylla*).
  - orange (*Choisya dumosa*).
  - persimmon (*Diospyros texana*).
  - piñon (*Pinus cembroides*).
  - plum (*Prunus mexicana*).

- Mexican—Continued.
  - stone pine (*Pinus cembroides*).
  - white pine (*Pinus strobiformis*).
- Mezereum (*Daphne mezereum*).
- Michigan holly (*Ilex verticillata*).
- Michaux sumac (*Rhus michauxii*).
- Miners' dogwood (*Cornus sessilis*).
- Mimosa (*Albizzia julubrissin, Leucaena pulverulenta*).
  - Pink (*Mimosa borealis*).
  - Velvetpod (*Mimosa dysocarpa*).
- Minnie-bush (*Menziesia pilosa*).
- Missouri,
  - currant (*Ribes odoratum*).
  - gooseberry (*Ribes missouriense, Ribes setosum*).
  - grape (*Vitis palmata*).
  - river willow (*Salix cordata*).
  - viburnum (*Viburnum affine*).
- Mock,
  - mesquite (*Calliandra eriophylla*).
  - heather (*Aplopappus ericoides*).
  - locust (*Amorpha californica*).
- Mockorange (*Bumelia lycioides, Philadelphus* spp.).
  - Mearn's (*Philadelphus mearnsii*).
  - Small-leaf (*Philadelphus microphyllus*).
- Mockernut hickory (*Carya alba*).
- Mohave,
  - dalea (*Dalea arborescens*).
  - desert-rue (*Thamnosma montana*).
  - horsebrush (*Tetradymia stenolepis*).
  - thorn (*Canotia holacantha*).
- Mohr's shinnery oak (*Quercus mohriana*).
- Monkeyflower,
  - Crimson (*Mimulus puniceus*).
  - Long (*Mimulus longiflorus*).
- Monterey,
  - cypress (*Cupressus macrocarpa*).
  - pine (*Pinus radiata*).
- Moonseed (*Menispermum canadense*).
- Mooseberry (*Viburnum alnifolium*).
- Moosewood (*Acer pennsylvanicum, Dirca palustris*).
- Morello cherry (*Prunus cerasus*).
- Mormon tea (*Ephedra viridis*).
- Moronel (*Lonicera subspicata*).
- Mortonia (*Mortonia utahensis*).
- Moss locust (*Robinia hispida*).
- Mossycup oak (*Quercus macrocarpa*).
- Mountain,
  - alder (*Alnus crispa, Alnus rhombifolia, Alnus sinuata, Alnus tenuifolia*).
  - ash (*Fraxinus texensis*).
  - balm (*Ceanothus velutinus, Eriodictyon californicum*).
  - balsam (*Abies lasiocarpa*).
  - birch (*Betula fontinalis*).
  - buckthorn (*Bumelia monticola*).
  - camellia (*Stuartia pentagyna*).
  - cedar (*Juniperus mexicana*).
  - cherry (*Prunus angustifolia*).
- Mountain—Continued.
  - clematis (*Clematis verticillaris*).
  - cranberry (*Hugeria erythrocarpa, Vaccinium vitis-idaea*).
  - currant (*Ribes viscosissimum*).
  - dogwood (*Cornus nuttallii*).
  - elder (*Sambucus caerulea*).
  - false-indigo (*Amorpha virgata*).
  - fetterbush (*Pieris floribunda*).
  - fly-honeysuckle (*Lonicera cauriana, Lonicera villosa*).
  - fringe (*Artemisia frigida*).
  - gooseberry (*Ribes montigenum, Ribes rotundifolium*).
  - grape (*Berberis acquifolium, Vitis berlandieri, Vitis rupestris*).
  - grape, little (*Vitis berlandieri*).
  - grape, sweet (*Vitis monticola*).
  - heather (*Phyllodoce caerulea*).
  - hemlock (*Tsuga mertensiana*).
  - holly (*Ilex montana*).
  - honeysuckle (*Lonicera dioica*).
  - hydrangea (*Hydrangea arborescens*).
  - indigo (*Amorpha glabra, Amorpha virgata*).
  - ironwood (*Cercocarpus betuloides*).
  - leatherwood (*Fremontia californica*).
- Mountain-lover (*Pachistima canbyi*).
- Mountain magnolia (*Magnolia acuminata, Magnolia fraseri, Magnolia pyramidata*).
- Mountain,
  - maple (*Acer glabrum, Acer spicatum*).
  - misery (*Chamaebatia foliolosa*).
  - oak (*Quercus kelloggii, Quercus montana*).
  - oread (*Magnolia pyramidata*).
  - pine (*Pinus pungens*).
  - privet (*Ilex montana*).
  - meadowsweet (*Spiraea virginiana*).
  - mulberry (*Morus microphylla*).
  - redcedar (*Juniperus scopulorum*).
  - rose bay (*Rhododendron catawbiense*).
  - silverbell (*Halesia monticola*).
  - snowberry (*Symphoricarpos oreophilus*).
  - sweet pepperbush (*Clethra acuminata*).
  - spicewood (*Calycanthus fertilis*).
  - sumac (*Rhus copallina*).
  - tea (*Gaultheria procubens*).
  - white oak (*Quercus douglasii, Quercus grisea*).
  - whitethorn (*Ceanothus cordulatus*).
  - willow (*Salix scouleriana*).
  - willow, false (*Salix pseudomonticola*).
- Mountain winterberry (*Ilex montana*).
- Mountain-ash, (*Sorbus americana*).
  - Alpine (*Sorbus occidentalis*).
  - American (*Sorbus americana*).

- Mountain-ash—Continued.
  - European (*Sorbus aucuparia*).
  - Greene (*Sorbus scopulina*).
  - Pacific (*Sorbus sitchensis*).
  - Western (*Sorbus sitchensis*).
- Mountain-holly (*Nemopanthus mucronata*).
- Mountain-laurel (*Kalmia latifolia*).
- Mountain-mahogany, (*Cercocarpus montanus*).
  - Alderleaf (*Cercocarpus alnifolius*).
  - Arizona (*Cercocarpus arizonicus*).
  - Bigleaf (*Cercocarpus traskiae*).
  - Birchleaf (*Cercocarpus betuloides*).
  - Curl-leaf (*Cercocarpus ledifolius*).
  - Small-flowered (*Cercocarpus minutiflorus*).
  - Silver (*Cercocarpus argenteus*).
- Moxie plum (*Chiogenes hispidula*).
- Mulberry,
  - Black (*Morus nigra*).
  - Mexican (*Morus microphylla*).
  - Mountain (*Morus microphylla*).
  - Red (*Morus rubra*).
  - Texas (*Morus microphylla*).
  - White (*Morus alba*).
- Mulefat (*Baccharis viminea*).
- Munson cherry (*Prunus munsoniana*).
- Murray pine (*Pinus murrayana*).
- Muscadine grape, (*Vitis rotundifolia*).
  - Little (*Vitis munsoniana*).
- Musk brush (*Ceanothus jepsonii*).
- Mustang grape (*Vitis candicans*).
- Mustard, sacred (*Nicotiana glauca*).
- Myrtle, (*Cyrilla racemiflora*).
  - California wax (*Myrica californica*).
  - Wax (*Myrica cerifera*).
  - Wild crape (*Malpighia glabra*).
- Myrtle boxleaf (*Pachistima myrsinites*).
- Myrtle-croton (*Bernardia myricaefolia*).
- Myrtleleaf,
  - croton (*Bernardia myricaefolia*).
  - oak (*Quercus myrtifolia*).
- Myrtle oak (*Quercus myrtifolia*).
- Naked withe rod (*Viburnum nudum*).
- Nanny plum (*Viburnum lentago*).
- Nannyberry (*Viburnum lentago, Viburnum prunifolium*).
  - Hairy (*Viburnum pubescens*).
  - Rusty (*Viburnum rufidulum*).
- Narrowleaf,
  - buckthorn (*Rhamnus lanceolata*).
  - cottonwood (*Populus angustifolia*).
  - crab apple (*Malus angustifolia*).
  - goldenbush (*Aplopappus linearifolius*).
  - laurel (*Kalmia angustifolia*).
  - papaw (*Asimina angustifolia*).
  - redroot (*Ceanothus ovatus*).
  - willow (*Salix exigua, Salix longifolia*).
- Narrowleaf yerba santa (*Eriodictyon angustifolium*)
- Necklace poplar (*Populus deltoides, Populus sargentii*).
- Needle palm (*Rhapidophyllum hystrix*).
- Nerango (*Prunus texana*).
- Netleaf,
  - hollygrape (*Berberis californicum*).
  - oak (*Quercus diversicolor*).
- Nettle-tree (*Celtis occidentalis*).
- Netvein acacia (*Acacia reticulata*).
- Nevada,
  - currant (*Ribes nevadense*).
  - dalea (*Parosela polyadenia*).
  - jointfir (*Ephedra nevadensis*).
  - wild almond (*Prunus andersonii*).
- Nevin hollygrape (*Berberis nevinii*).
- Newberry falsemallow (*Horsfordia newberryi*).
- New Jersey-tea (*Ceanothus americanus*).
- New Mexican,
  - locust (*Robinia neomexicana*).
  - rubberbush (*Parthenium incanum*).
  - shinnery oak (*Quercus novomexicana*).
- New Mexico,
  - buckeye (*Ungnadia speciosa*).
  - clematis (*Clematis neomexicana*).
- Nightshade, bitter (*Solanum dulcamara*).
- Ninebark (*Physocarpus capitatus, Physocarpus opulifolius*).
  - Alabama (*Physocarpus alabamensis*).
  - Dwarf (*Physocarpus alternans*).
  - Mallow (*Physocarpus malvaceus*,
  - Prairie (*Physocarpus intermedius*).
- Noble fir (*Abies nobilis*).
- Nogal (*Juglans major*).
- Northern,
  - alder (*Alnus sinuata*).
  - fox grape (*Vitis labrusca*).
  - gooseberry (*Ribes oxyacanthoides*).
  - pin oak (*Quercus ellipsoidalis*).
  - prickly-ash (*Xanthoxylum americanum*).
  - red oak (*Quercus borealis*).
  - sloe (*Prunus alleghaniensis*).
  - white cedar (*Thuja occidentalis*).
  - white pine (*Pinus strobus*).
- Norway pine (*Pinus resinosa*).
- Nut pine (*Pinus cembroides, Pinus edulis, Pinus monophylla, Pinus parryana*).
- Nutbrush (*Simmondsia chinensis*).
- Nutmeg, California (*Tumion californicum*).
- Nutmeg, hickory (*Carya myristicaeformis*).
- Nuttall,
  - globemallow (*Malvastrum nuttallii*).
  - horsebrush (*Tetradymia nuttallii*).
  - willow (*Salix scouleriana*).

Oak,
Arizona white (*Quercus arizonica*).
Barren (*Quercus ilicifolia, Quercus marilandica*).
Basket (*Quercus durandii, Quercus prinus*).
Bastard (*Quercus coccinea, Quercus durandii*).
Bastard white (*Quercus austrina*).
Bear (*Quercus ilicifolia, Quercus sadleriana*).
Black (*Quercus coccinea,*) *Quercus emoryi*).
Black scrub (*Quercus ilicifolia*).
Blackjack (*Quercus marilandica*).
Blue (*Quercus douglasii*).
Bluejack (*Quercus cinerea*).
Box white (*Quercus stellata*).
Boynton (*Quercus boyntonii*).
Bray (*Quercus brayi*).
Brewer (*Quercus garryana*).
Buck (*Quercus coccinea*).
Bur (*Quercus macrocarpa*).
California black (*Quercus kelloggii*).
California blue (*Quercus douglasii*).
California live (*Quercus agrifolia*).
California scrub (*Quercus dumosa*).
California tanbark (*Quercus densiflora*).
California white (*Quercus lobata*).
Canyon live (*Quercus chrysolepis, Quercus wislizenii*).
Chapman (*Quercus chapmanii*).
Chapman white (*Quercus chapmanii*).
Chestnut (*Quercus montana*).
Chinquapin (*Quercus muehlenbergii*).
Chisos red (*Quercus gravesii*).
Coast live (*Quercus agrifolia, Quercus pricei*).
Colorado white (*Quercus leptophylla*).
Cow (*Quercus prinus*).
Deer (*Quercus sadleriana*).
Duck (*Quercus nigra*).
Durand (*Quercus durandii*).
Durand white (*Quercus durandii*).
Dwarf chinquapin (*Quercus prinoides*).
Dyer (*Quercus velutina*).
Emory (*Quercus emoryi*).
Evergreen (*Quercus engelmannii*).
Evergreen white (*Quercus engelmanii*).
Fendler (*Quercus fendleri*).
Gambel (*Quercus gambelii*).
Garry (*Quercus garryana*).
Georgia (*Quercus georgiana*).
Grave's (*Quercus gravesii*).
Gray (*Quercus grisea*).
Havard's shinnery (*Quercus havardii*).
Hedgehog (*Lithocarpus densiflora*).
Highland live (*Quercus wislizenii*).
Holly (*Quercus undulata*).
Huckleberry (*Quercus vaccinifolia*).
Interior live (*Quercus wislizenii*).

Oak—Continued.
Iron (*Quercus chrysolepis, Quercus stellata*).
Island live (*Quercus tomentella*).
Jack (*Quercus ellipsoidalis, Quercus marilandica*).
Lacey (*Quercus laceyi*).
Laurel (*Quercus imbricaria, Quercus laurifolia, Quercus phellos*).
Laurelleaf (*Quercus laurifolia*).
Leather (*Quercus dumosa*).
Live (*Quercus virginiana*).
MacDonald (*Quercus dumosa*).
Mesa (*Quercus engelmannii*).
Mexican blue (*Quercus oblongifolia*).
Mohr's shinnery (*Quercus mohriana*).
Mossycup (*Quercus macrocarpa*).
Mountain (*Quercus kelloggii, Quercus montana*).
Mountain white (*Quercus douglasii, Quercus grisea*).
Myrtle (*Quercus myrtifolia*).
Myrtleleaf (*Quercus myrtifolia*).
Netleaf (*Quercus diversicolor*).
New Mexican shinnery (*Quercus novomexicana*).
Northern pin (*Quercus ellipsoidalis*).
Northern red (*Quercus borealis*).
Oregon white (*Quercus garryana*).
Overcup (*Quercus lyrata, Quercus macrocarpa*).
Palmer (*Quercus palmeri*).
Pin (*Quercus laurifolia, Quercus palustris, Quercus phellos*).
Possum (*Quercus nigra*).
Post (*Quercus stellata*).
Punk (*Quercus nigra*).
Quercitron (*Quercus velutina*).
Red (*Quercus coccinea, Quercus rubra, Quercus velutina*).
Rock (*Quercus douglassii, Quercus montana*).
Rock chestnut (*Quercus montana*).
Rocky Mountain shin (*Quercus undulata*).
Rocky Mountain white (*Quercus leptophylla, Quercus utahensis*).
Running (*Quercus pumila*).
Rydberg (*Quercus rydbergiana*).
Sadler (*Quercus sadleriana*).
Scarlet (*Quercus coccinea*).
Schneck red (*Quercus shumardii*).
Scrub (*Quercus catesbei, Quercus macrocarpa, Quercus marilandica, Quercus prinoides*).
Scrub chestnut (*Quercus prinoides*).
Shin (*Quercus mohriana, Quercus undulata*).
Shingle (*Quercus imbricaria*).
Shinnery (*Quercus havardii*).

Oak—Continued.
  Shumard red (*Quercus shumardii*).
  Silver (*Quercus hypoleuca*).
  Slick (*Quercus velutina*).
  Slickbark (*Quercus velutina*).
  Small chestnut (*Quercus prinoides*).
  Small post (*Quercus margaretta*).
  Smoothbark (*Quercus velutina*).
  Southern red (*Quercus rubra*).
  Spanish (*Quercus coccinea*,
    Quercus digitata,
    Quercus rubra).
  Spotted (*Quercus coccinea*,
    Quercus nigra,
    Quercus shumardii,
    Quercus texana).
  Swamp (*Quercus bicolor*,
    Quercus palustris).
  Swamp chestnut (*Quercus prinus*).
  Swamp post (*Quercus lyrata*).
  Swamp Spanish (*Quercus palustris*).
  Swamp white (*Quercus bicolor*,
    Quercus prinus).
  Switch (*Quercus undulata*).
  Tan (*Lithocarpus densiflora*).
  Tanbark (*Lithocarpus densiflora*,
    Quercus montana,
    Quercus velutina).
  Texas red (*Quercus texana*).
  Toumey (*Quercus toumeyi*).
  Turkey (*Quercus cinerea*,
    Quercus ilicifolia,
    Quercus rubra).
  Upland willow (*Quercus cinerea*).
  Valley white (*Quercus lobata*).
  Vasey (*Quercus undulata*).
  Water (*Quercus arkansana*,
    Quercus imbricaria,
    Quercus laurifolia,
    Quercus nigra,
    Quercus palustris,
    Quercus phellos).
  Wavyleaf (*Quercus undulata*).
  White (*Quercus alba*,
    Quercus durandii,
    Quercus oblongifolia,
    Quercus stellata).
  White water (*Quercus lyrata*).
  Whiteleaf (*Quercus hypoleuca*).
  Wilcox (*Quercus wilcoxii*).
  Willow (*Quercus phellos*).
  Willowleaf (*Quercus phellos*).
  Wislizenius (*Quercus wislizenii*).
  Yellow (*Quercus velutina*).
Oakleaf hydrangea (*Hydrangea quercifolia*).
Oceanspray (*Holodiscus discolor*).
Ocotillo (*Fouquieria splendens*).
Ogeche,
  lime (*Nyssa ogeche*).
  plum (*Nyssa ogeche*).
Ohio buckeye (*Aesculus glabra*).
Oklahoma plum (*Prunus gracilis*).
Old-field,
  birch (*Betula populifolia*).
  pine (*Pinus taeda*).
  plum (*Prunus umbellata*).
Oldman's beard (*Hydrangea quercifolia*).
Olive, Russian (*Elaeagnus angustifolia*).
Olive tree, wild (*Halesia carolina*).
One-berry (*Celtis occidentalis*).
One-color willow (*Salix monochroma*).
One-seed juniper (*Juniperus monosperma*).
Opopanax (*Acacia farnesiana*).
  Yellow (*Acacia farnesiana*).
Opossum-wood (*Halesia carolina*).
Orange,
  Bitter (*Citrus trifoliata*).
  Mexican (*Choisya dumosa*).
  Mock (*Prunus caroliniana*).
  Osage (*Maclura pomifera*).
  Wild (*Prunus caroliniana*).
Orange,
  gooseberry (*Ribes pinetorum*).
  honeysuckle (*Lonicera ciliosa*).
Oregon,
  alder (*Alnus rubra*).
  ash (*Fraxinus oregona*).
  box-bush (*Pachistima myrsinites*).
  crab apple (*Malus fusca*).
  Douglas fir (*Pseudotsuga taxifolia*).
  gooseberry (*Ribes lobbii*).
  hollygrape (*Berberis aquifolium*,
    Berberis nervosa).
  maple (*Acer macrophyllum*).
  myrtle (*Umbellularia californica*).
  pine (*Pseudotsuga taxifolia*).
  tea-tree (*Ceanothus sanguineus*).
  viburnum (*Viburnum ellipticum*).
  white oak (*Quercus garryana*).
Oregon-grape (*Berberis aquifolium*,
    Berberis nervosa,
    Berberis repens).
Osage-orange (*Maclura pomifera*).
Osier,
  Red (*Cornus stolonifera*).
  Western (*Cornus occidentalis*).
Oso berry (*Osmaronia cerasiformis*).
Overcup, oak (*Quercus lyrata*,
    Quercus macrocarpa).
Oxeye, sea (*Borrichia frutescens*).
Ozark chinquapin (*Castanea ozarkensis*).
Pachysandra (*Pachysandra procumbens*).
Pacific,
  grape (*Vitis californica*).
  mountain-ash (*Sorbus sitchensis*).
  plum (*Prunus subcordata*).
  waxmyrtle (*Myrica californica*).
  yew (*Taxus brevifolia*).
Paintbrush, bush (*Castilleja hololeuca*).
Palaverde (*Canotia holacantha*).
Pale,
  desert-thorn (*Lycium pallidum*).
  dogwood (*Cornus obliqua*).
  elderberry (*Sambucus coerulea*).
  laurel (*Kalmia polifolia*).
  silktassel (*Garrya flavescens*).
  wolfberry (*Lycium pallidum*).

- Palm, Texas (*Sabal texana*).
- Palmer,
  - clematis (*Clematis palmeri*).
  - cottonwood (*Populus palmeri*).
  - goldenbush (*Aplopappus palmeri*).
  - oak (*Quercus palmeri*).
- Palmetto, cabbage (*Sabal palmetto*).
- Paloblanco (*Celtis lindheimeri, Celtis reticulata, Forestiera neomexicana*).
- Paloduro (*Celtis reticulata*).
- Paloverde (*Cercidium macrum, Cercidium torreyanum*).
- Panhandle grape (*Vitis doaniana*).
- Panicled dogwood (*Cornus paniculata*).
- Papaw,
  - Common (*Asimina triloba*).
  - Dwarf (*Asimina parviflora*).
  - Narrowleaf (*Asimina angustifolia*).
  - Small-flowered (*Asimina parviflora*).
  - Small-fruited (*Asimina parviflora*).
- Paper,
  - birch (*Betula papyrifera, Betula populifolia*).
  - mulberry (*Broussonetia papyrifera*).
- Paperleaf alder (*Alnus tenuifolia*).
- Paradise flower (*Acacia greggi*).
- Parish,
  - desert-thorn (*Lycium parishii*).
  - goldenbush (*Aplopappus parishii*).
- Parry,
  - lenscale (*Atriplex parryi*).
  - manzanita (*Arctostaphylos manzanita*).
  - piñon (*Pinus parryana*).
  - saltbush (*Atriplex parryi*).
- Partridge berry (*Mitchella repens*).
- Pasture gooseberry (*Ribes cynosbatii*).
- Pavonia (*Pavonia lasiopetala*).
- Peach,
  - Desert (*Prunus andersonii*).
  - Wild (*Prunus carolinia, Prunus texana*).
- Peach,
  - oak (*Quercus phellos*).
  - thorn (*Lycium cooperi*).
- Peachleaf willow (*Salix amygdaloides*).
- Peaflower locust (*Robinia pseudoacacia*).
- Pecan (*Carya pecan*) .
- Pencil-tree (*Baccharis halimifolia*).
- Pentstemon,
  - Heartleaf (*Pentstemon cordifolius*).
  - Rothrock (*Pentstemon rothrockii*).
  - Shortflower (*Pentstemon breviflorus*).
  - Snapdragon (*Pentstemon antirrhinoides*).
- Pepperbush,
  - Mountain sweet (*Clethra acuminata*).
  - Sweet (*Clethra alnifolia*).
- Pepperidge (*Cissus arborea, Nyssa sylvatica*).
- Peppervine (*Cissus arborea*).
- Pepperwood (*Umbellularia californica, Xanthoxylum clava-herculis*).
- Perfumed cherry (*Prunus mahaleb*).
- Persimmon (*Diospyros virginiana*).
  - Black (*Diospyros texana*).
  - Mexican (*Diospyros texana*).
- Pickleweed (*Allenrolfea occidentalis*).
- Piedmont rhododendron (*Rhododendron minus*).
- Pigeon cherry (*Prunus pennsylvanica*).
- Pigeonberry (*Amelanchier alnifolia, Amelanchier florida, Cornus alternifolia, Rhamnus californica*).
- Pigmy-cedar (*Peucephyllum schottii*).
- Pignut, (*Simmondsia chinensis*).
  - hickory (*Carya cordiformis, Carya glabra, Carya leiodermis, Carya pallida, Carya villosa*).
- Pilgrim grape (*Vitis novae-angliae*).
- Pima ratany (*Krameria parvifolia*).
- Pin cherry (*Prunus pennsylvanica*).
- Pinchot juniper (*Juniperus pinchottii*).
- Pine,
  - Apache (*Pinus apacheca*).
  - Arizona (*Pinus arizonica*).
  - Banks (*Pinus banksiana*).
  - Bigcone (*Pinus coulteri*).
  - Bishop (*Pinus muricata*).
  - Black (*Pinus serotina, Pinus taeda*).
  - Bristlecone (*Pinus aristata*).
  - Carribean (*Pinus caribaea*).
  - Chihuahua (*Pinus leiophylla*).
  - Coulter (*Pinus coulteri*).
  - Digger (*Pinus sabiniana*).
  - Fat (*Pinus australis*).
  - Foxtail (*Pinus aristata, Pinus balfouriana*).
  - Georgia (*Pinus australis*).
  - Gray (*Pinus banksiana*).
  - Hickory (*Pinus aristata*).
  - Jack (*Pinus banksiana*).
  - Jeffrey (*Pinus jeffreyi*).
  - Jersey (*Pinus virginiana*).
  - Knobcone (*Pinus attenuata*).
  - Limber (*Pinus flexilis*).
  - Loblolly (*Pinus taeda*).
  - Lodgepole (*Pinus contorta, Pinus murrayana*).
  - Longleaf (*Pinus australis*).
  - Marsh (*Pinus serotina*).
  - Mexican stone (*Pinus cembroides*).
  - Mexican white (*Pinus strobiformis*).
  - Monterey (*Pinus radiata*).
  - Mountain (*Pinus pungens*).
  - Murray (*Pinus murrayana*).
  - Northern white (*Pinus strobus*).
  - Norway (*Pinus resinosa*).
  - Nut (*Pinus cembroides, Pinus edulis, Pinus monophylla, Pinus parryana*).
  - Oldfield (*Pinus taeda*).
  - Oregon (*Pseudotsuga taxifolia*).
  - Pitch (*Pinus rigida*).

Pine—Continued.
Pond (*Pinus serotina*).
Prickle-cone (*Pinus muricata*).
Red (*Pinus resinosa*, *Pseudotsuga glauca*).
Rocky mountain yellow (*Pinus brachyptera*).
Rosemary (*Pinus taeda*).
Sabine (*Pinus sabiniana*).
Sand (*Pinus clausa*).
Santa Cruz Island (*Pinus remorata*).
Scrub (*Pinus banksiana*, *Pinus virginiana*).
Shore (*Pinus contorta*).
Shortleaf (*Pinus echinata*, *Pinus taeda*).
Singleleaf (*Pinus monophylla*).
Slash (*Pinus caribaea*).
Southern (*Pinus australis*).
Southern hard (*Pinus australis*).
Southern yellow (*Pinus echinata*).
Spruce (*Picea mariana*, *Pinus contorta*, *Pinus glabra*, *Tsuga canadensis*).
Sugar (*Pinus lambertiana*).
Swamp (*Pinus caribaea*, *Pinus palustris*).
Table-mountain (*Pinus pungens*).
Tamarac (*Pinus murrayana*).
Torrey (*Pinus torreyana*).
Virginia (*Pinus virginiana*).
Western white (*Pinus monticola*).
Western yellow (*Pinus ponderosa*).
White (*Picea engelmannii*, *Pinus flexilis*, *Pinus glabra*, *Pinus strobus*).
Whitebark (*Pinus albicaulis*).
Yellow (*Pinus australis*, *Pinus echinata*, *Pinus ponderosa*).
bush (*Aplopappus pinifolius*).
Pineleaf goldenbush (*Aplopappus pinifolius*).
Pine-mat (*Ceanothus diversifolius*).
manzanita (*Arctostaphylos nevadensis*).
Pink,
honeysuckle (*Lonicera hispidula*).
meadow spiraea (*Spiraea latifolia*).
mimosa (*Mimosa borealis*).
sophora (*Sophora affinis*).
Pinkshell azalea (*Rhododendron vaseyi*).
Pin oak, (*Quercus laurifolia*, *Quercus palustris*, *Quercus phellos*).
Northern (*Quercus ellipsoidalis*).
Piñon (*Pinus edulis*, *Pinus monophylla*).
Pinxter flower (*Rhododendron canescens*, *Rhododendron nudiflorum*).
Piper willow (*Salix piperi*).
Pipestem (*Clematis lasiantha*).
Pipe-vine, (*Aristolochia durior*, *Aristolochia tomentosa*).
Dutchman's (*Aristolochia durior*).
California Dutchman's (*Aristolochia californica*).
Woolly (*Aristolochia tomentosa*).
Pitch pine (*Pinus rigida*).
Planetree (*Platanus occidentalis*).
Planer-tree (*Planera aquatica*).
Plateau gooseberry (*Ribes velutinum*).
Plum,
Allegheny (*Prunus alleghеniensis*).
Beach (*Prunus maritima*).
Big-tree (*Prunus mexicana*).
Bullace (*Prunus umbellata*).
Canada (*Prunus nigra*).
Chickasaw (*Prunus angustifolia*, *Prunus umbellata*).
Creek (*Prunus rivularis*).
Deer (*Chrysobalanus oblongifolius*).
Downward (*Bumelia spiniflora*).
Hog (*Colubrina texensis*, *Prunus reverchonii*, *Prunus umbellata*).
Horse (*Prunus americana*, *Prunus nigra*).
Hortulan (*Prunus hortulana*).
Klamath (*Prunus subcordata*).
May (*Prunus texana*).
Mexican (*Prunus mexicana*).
Moxie (*Chiogenes hispidula*).
Nanny (*Viburnum lentago*).
Ogeche (*Nyssa ogeche*).
Oklahoma (*Prunus gracilis*).
Oldfield (*Prunus umbellata*).
Pacific (*Prunus subcordata*).
Porter's (*Prunus alleghaniensis*).
Prairie (*Prunus umbellata*).
Saffron (*Bumelia spiniflora*).
Sand (*Prunus texana*).
Shore (*Prunus maritima*).
Sierra (*Prunus subcordata*).
Western wild (*Prunus subcordata*).
Wild (*Prunus americana*, *Prunus lanata*, *Prunus nigra*).
Wild garden (*Prunus hortulana*).
Wild goose (*Prunus hortulano*, *Prunus munsoniana*).
Wild red (*Prunus americana*).
Wild yellow (*Prunus americana*).
Plum grape (*Vitis labrusca*).
Plumas bush (*Ceanothus lemmonii*).
Plumleaf cherry (*Prunus emarginata*).
Plymouth crowberry (*Corema conradii*).
Pointleaf manzanita (*Arctostaphylos pungens*).
Poison,
ash (*Rhus vernix*).
bay (*Illicium floridanum*).
dogwood (*Rhus vernix*).
elder (*Rhus vernix*).
sumac (*Rhus vernix*).
Poisonbean (*Daubenbonia drummondii*).

- Poison-ivy (*Rhus toxicodendron*).
- Poison-oak (*Rhus diversiloba*, *Rhus toxicodendron*, *Rhus vernix*).
- Polecat tree (*Rhamnus caroliniana*).
- Polished willow (*Salix laevigata*).
- Polygala,
  - Desert (*Polygala acanthoclada*).
  - Thorn (*Polygala acanthoclada*).
- Pond,
  - brush (*Forestiera acuminata*).
  - pine (*Pinus serotina*).
  - spice (*Glabraria geniculata*).
- Pondbush (*Glabraria geniculata*).
- Pondcypress (*Taxodium ascendens*).
- Ponil (*Fallugia paradoxa*).
- Popinack (*Acacia farnesiana*).
- Poplar,
  - Balsam (*Populus balsamifera*).
  - Blue (*Liriodendron tulipifera*).
  - Downy (*Populus heterophylla*).
  - Hickory (*Liriodendron tulipifera*).
  - Necklace (*Populus deltoides*, *Populus sargentii*).
  - Rydberg (*Populus acuminata*).
  - Silver (*Populus alba*).
  - White (*Liriodendron tulipifera*, *Populus alba*).
  - Yellow (*Liriodendron tulipfera*.
- Popotillo (*Ephedra antisyphilitica*, *Ephedra trifurca*).
- Poppy,
  - Bush (*Dendromecon rigida*).
  - Tree (*Dendromecon rigida*).
- Porter's plum (*Prunus allegheniensis*).
- Port Orford cedar (*Chamaecyparis lawsoniana*).
- Possum,
  - grape (*Vitis baileyana*).
  - oak (*Quercus nigra*).
  - wood (*Diospyros virginiana*).
- Possumhaw (*Ilex decidua*, *Viburnum nudum*).
- Post,
  - cedar (*Libocedrus decurrens*).
  - locust (*Robinia pseudoacacia*).
  - oak (*Quercus stellata*).
- Post-oak grape (*Vitis lincecumii*).
- Poverty birch (*Betula populifolia*).
- Powdery storax (*Styrax pulverulenta*).
- Prairie,
  - acacia (*Acacia angustissima*).
  - crab apple (*Malus ioensis*).
  - guajillo (*Acacia angustissima*).
  - ninebark (*Physocarpus intermedius*).
  - plum (*Prunus umbellata*).
  - weed (*Potentilla fruticosa*).
  - willow (*Salix humilis*).
- Pretty willow (*Salix bella*).
- Prickle-cone pine (*Pinus muricata*).
- Prickly,
  - ash (*Aralia spinosa*).
  - gooseberry (*Ribes cynosbatii*).
- Pride of China (*Melia azedarach*).
- Privet, (*Forestiera acuminata*, *Ilex decidua*, *Ilex longipes*, *Ligustrum vulgare*).
  - Mountain (*Ilex montana*).
  - Swamp (*Forestiera acuminata*).
  - andromeda (*Xolisma ligustrina*).
  - lippia (*Lippia ligustrina*).
- Punk oak (*Quercus nigra*).
- Purple,
  - anise (*Illicium floridanum*).
  - azalea (*Rhododendron nudiflorum*).
  - chokeberry (*Aronia arbutifolia*).
  - dogwood (*Cornus alternifolia*).
  - haw (*Condalia obovata*).
  - virgins-bower (*Clematis verticillaris*).
- Pumpkin ash (*Fraxinus profunda*).
- Pussy willow (*Salix discolor*).
  - dwarf (*Salix tristis*).
- Pyramid magnolia (*Magnolia pyramidata*).
- Quaking aspen (*Populus tremuloides*).
- Quarter-vine (*Bignonia capreolata*).
- Quercitron oak (*Quercus velutina*).
- Quinine,
  - bush (*Cowania stansburiana*, *Garrya elliptica*, *Garrya flavescens*).
  - cherry (*Prunus emarginata*).
  - plant (*Simmondsia chinensis*).
- Quinsy berry (*Ribes hudsonianum*).
- Rabbit thorn (*Lycium pallidum*).
- Rabbitberry (*Shepherdia argentea*).
- Rabbitbrush,
  - Douglas (*Chrysothamnus viscidiflorus*).
  - Rubber (*Chrysothamnus nauseosus*).
  - Spring (*Tetradymia glabrata*).
  - Sticky (*Chrysothamnus paniculatus*).
  - Sticky flower (*Chrysothamnus viscidiflorus*).
- Rabbiteye blueberry (*Vaccinium virgatum*).
- Raisin, wild (*Viburnum cassinoides*, *Viburnum lentago*).
- Ramoceniza (*Parosela spinosa*).
- Ramona bush (*Ceanothus tomentosus*).
- Ramshorn (*Acacia greggii*).
- Range ratany (*Krameria glandulosa*).
- Ratany,
  - Pima (*Krameria parvifolia*).
  - Range (*Krameria glandulosa*).
  - White (*Krameria grayi*).
- Rat-stripper (*Pachistima canbyi*).
- Rattan vine (*Berchemia scandens*).
- Rattlebox (*Halesia carolina*).
- Red,
  - alder (*Alnus rubra*).
  - ash (*Fraxinus pennsylvanica*).
  - bilberry (*Vaccinium parvifolium*).
  - birch (*Betula fontinalis*, *Betula nigra*).
  - brush (*Lippia berlandieri*, *Quercus ilicifolia*).
  - buckeye (*Aesculus pavia*).

Red—Continued.
  chokeberry (*Aronia arbutifolia*).
  cypress (*Taxodium distichum*).
  elder (*Sambucus callicarpa*,
    Sambucus pubens).
  elm (*Ulmus alata*,
    Ulmus fulva,
    Ulmus serotina).
  fir (*Abies magnifica*,
    Pseudotsuga glauca,
    Abies nobilis,
    Pseudotsuga taxifolia).
  fir, California (*Abies magnifica*).
  fir, Shasta (*Abies magnifica*).
  grape (*Vitis palmata*).
  gum (*Liquidambar styraciflua*).
  heart (*Ceanothus spinosus*).
  heather (*Phyllodoce breweri*,
    Phyllodoce empetriformis).
  hollygrape (*Berberis haematocarpa*).
  huckleberry (*Vaccinium parvifolium*).
  locust (*Robinia pseudoacacia*).
  maple (*Acer rubrum*).
  moonseed (*Cebatha carolina*).
  mulberry (*Morus rubra*).
  oak (*Quercus coccinea*,
    Quercus rubra,
    Quercus velutina).
  pine (*Pinus resinosa*,
    Pseudotsuga glauca).
  spruce (*Picea rubra*).
  sage (*Trixis californica*).
  soapbloom (*Ceanothus sanguineus*).
  twinberry (*Lonicera utahensis*).
  whortleberry (*Vaccinium parvifolium*).
  willow (*Salix laevigata*,
    Salix lasiandra).
Redbay, (*Gordonia lasianthus*,
  Persea borbonia).
  Smooth (*Persea borbonia*).
  Swamp (*Persea pubescens*).
Redberry, (*Rhamnus crocea*)
  bamboo (*Smilax walteri*).
  elder (*Sambucus callicarpa*).
  juniper (*Juniperus pinchotii*).
Redbud, (*Cercis canadensis*).
  California (*Cercis occidentalis*).
Redbud serviceberry (*Amelanchier prunifolia*).
Redbud,
  Texas (*Cercis reniformis*).
  Western (*Cercis occidentalis*).
Red-cardinal (*Erythrina arborea*).
Red cedar, (*Juniperus scopulorum*,
  Thuja plicata).
  Eastern (*Juniperus virginiana*).
  Mountain (*Juniperus scopulorum*).
  Rocky mountain (*Juniperus scopulorum*).
  Southern (*Juniperus lucayana*).
  Western (*Thuja plicata*).
Red-flowered,
  clematis (*Clematis pitcheri*).
  currant (*Ribes sanguineum*).

Red-fruited juniper (*Juniperus erythrocarpa*).
Red-osier (*Cornus stolonifera*).
Redroot, (*Ceanothus americanus*,
  Ceanothus intermedius,
  Ceanothus ovatus).
Redshank (*Adenostoma sparsifolium*).
  grape (*Vitis rufotomentosa*).
Redstem,
  buckthorn (*Rhamnus rubra*).
  ceanothus (*Ceanothus sanguineus*).
Redwood (*Sequoia sempervirens*).
  California (*Sequoia sempervirens*).
Rhododendron, (*Rhododendron maximum*).
  Carolina (*Rhododendron carolinianum*).
  Catawba (*Rhododendron catawbiense*).
  Coast (*Rhododendron californicum*).
  Lapland (*Rhododendron lapponicum*).
  Piedmont (*Rhododendron minus*).
  Rocky mountain (*Rhododendron albiflorum*).
  Rosebay (*Rhododendron maximum*).
Rhodora (*Rhododendron canadense*).
Ribbonwood (*Adenostoma sparsifolium*).
Rigid,
  brickellbush (*Brickellia frutescens*).
  ceanothus (*Ceanothus rigidus*).
River,
  birch (*Betula nigra*).
  cottonwood (*Populus sargentii*).
  maple (*Acer saccharinum*).
  willow (*Salix fluviatillis*).
River willow, Missouri (*Salix cordata*,
  Salix missouriense).
Riverbank grape (*Vitis vulpina*).
Rock,
  chestnut oak (*Quercus montana*).
  clematis (*Clematis verticillaris*).
  elm (*Ulmus racemosa*).
  gooseberry (*Ribes quercetorum*).
  grape (*Vitis rupestris*).
  maple (*Acer saccharum*).
  nettle (*Eucnide urens*).
  oak (*Quercus douglasii*,
    Quercus montana).
Rockbrush (*Eysenhardtia polystachya*).
Rocky mountain,
  redcedar (*Juniperus scopulorum*).
  rhododendron (*Rhododendron albiflorum*).
  red cherry (*Prunus corymbulosa*).
  shin oak (*Quercus undulata*).
  white oak (*Quercus leptophylla*,
    Quercus utahensis).
  whortleberry (*Vaccinium oreophilum*).
  yellow pine (*Pinus brachyptera*).
Romero (*Trichostema lanatum*).
Rope-vine (*Clematis pauciflora*).
Rosa, malva (*Lavatera assurgentiflora*).

- Rose-acacia (*Robinia lispida*).
- Rosebay, (*Rhododendron maximum*).
  - Lapland (*Rhododendron lapponicum*).
  - Mountain (*Rhododendron catawbiense*).
- Rosebay rhododendron (*Rhododendron maximum*).
- Rosemary (*Ceratiola ericoides*).
  - pine (*Pinus taeda*).
  - willow (*Salix petiolaris*).
- Roses (*Rosa* spp.).
- Rosin brush (*Baccharis sarothroides*).
- Rothrock,
  - currant (*Ribes wolfii*).
  - pentstemon (*Pentstemon rothrockii*).
- Rough arrowwood (*Viburnum scabrellum*).
- Roughish arrowwood (*Viburnum scabrellum*).
- Roughleaf,
  - cornel (*Cornus asperifolia*).
  - manzanita (*Arctostaphylos drupacea*).
- Rough-leaved,
  - cornel (*Cornus asperifolia*, *Cornus circinata*).
  - dogwood (*Cornus asperifolia*).
- Round-flowered catclaw (*Acacia roemeriana*).
- Roundleaf,
  - gooseberry (*Ribes rotundifolium*).
  - grape (*Vitis helleri*).
  - snowberry (*Symphoricarpos rotundifolius*).
- Rubber rabbitbrush (*Chrysothamnus nauseosus*).
- Rum cherry (*Prunus serotina*).
- Running,
  - oak (*Quercus pumila*).
  - strawberrybush (*Evonymus obovatus*).
- Russet,
  - alder (*Alnus crispa*).
  - buffaloberry (*Shepherdia canadensis*).
- Russian-olive (*Elaeagnus angustifolia*).
- Rusty,
  - blackhaw (*Viburnum rufidulum*).
  - nannyberry (*Viburnum rufidulum*).
- Rustyleaf (*Menziesia ferruginea*).
- Rydberg,
  - oak (*Quercus rydbergiana*).
  - poplar (*Populus acuminata*).
- Sabine pine (*Pinus sabiniana*).
- Sacred mustard (*Nicotiana glauca*).
- Sadler oak (*Quercus sadleriana*).
- Sage,
  - Ambrosia bur (*Franceria ambrosiodes*).
  - Autumn (*Salvia greggii*).
  - Bee (*Hyptis emoryi*).
  - Black (*Artemisia arbuscula*, *Salvia mellifera*).
  - Bladder (*Salazaria mexicana*).
  - Colorado (*Artemisia tridentata*).
  - Desert (*Salvia carnosa*).
- Sage—Continued.
  - Gregg (*Salvia greggii*).
  - Hollyleaf bur (*Franceria ilicifolia*).
  - Little (*Artemisia nova*).
  - Red (*Trixis californica*).
  - Salt (*Atriplex canescens*).
  - Sheep (*Eriogonum microthecum*).
  - Shrubby blue (*Salvia ballotaeflora*).
  - Water (*Atriplex torreyi*).
  - White (*Eurotia lanata*, *Salvia apiana*).
  - White bee (*Salvia apiana*).
  - Wolly bur (*Franseria erioscentra*).
- Sage willow (*Salix candida*, *Salix tristis*).
- Sagebrush,
  - Basin (*Artemisia tridentata*).
  - Big (*Artemisia tridentata*).
  - Bigelow (*Artemisia bigelovii*).
  - Bud (*Artemisia spinescens*).
  - Coastal (*Artemisia californica*).
  - Flat (*Artemisia bigelovii*).
  - Hoary (*Artemisia cana*).
  - Low (*Artemisia arbuscula*).
  - Sand (*Artemisia filifolia*).
  - Scabland (*Artemisia arbuscula*, *Artemisia rigida*).
  - Silver (*Artemisia cana*).
  - Small (*Artemisia nova*).
  - Stiff (*Artemisia rigida*).
  - Threetip (*Artemisia tripartita*).
- St.-Andrews'-cross (*Ascyrum hypericoides*, *Ascyrum linifolium*).
- St. Johnswort, shrubby (*Hypericum prolificum*).
- St.-Peter's-wort (*Ascyrum stans*).
- Salad tree (*Cercis canadensis*).
- Salal, (*Gaultheria shallon*).
  - berry (*Gaultheria shallon*).
- Saloop (*Sassafras albidum*).
- Salt sage (*Atriplex canescens*).
- Saltbush,
  - Big (*Atriplex lentiformis*).
  - Parry (*Atriplex parryi*).
- Saltcedar (*Tamarix gallica*).
- San Gabriel globemallow (*Malvastrum gabrielense*).
- Sand,
  - cherry (*Prunus pumila*).
  - grape (*Vitus lincecumii*, *Vitus rupestris*).
  - jack (*Quercus cinerea*).
  - pine (*Pinus clausa*).
  - plum (*Prunus texana*).
  - sagebrush (*Artemisia filifolia*).
  - scrub (*Ceanothus dentatus*).
- Sandbar willow (*Salix exigua*, *Salix interior*, *Salix sessilifolia*).
- Sandbur (*Franseria dumosa*).
- Sandmat manzanita (*Arctostaphylos pumila*).
- Sandmyrtle, box (*Leiophyllum buxifolium*).

- Sangre de drago (*Jatropha spathulata*).
- Santa Cruz,
  - Island pine (*Pinus remorata*).
  - ironwood (*Lyonothamnus floribundus*).
- Santa Lucia fir (*Abies venusta*).
- Sargent,
  - cottonwood (*Populus sargentii*).
  - cypress (*Cupressus sargentii*).
- Sarsaparilla (*Smilax lanceolata*, *Smilax walteri*).
  - Wild (*Smilax glauca*).
- Sarsaparilla vine (*Smilax pumila*).
- Sarvisberry (*Amelanchier alnifolia*, *Amelanchier canadensis*, *Amelanchier florida*).
- Sassafras (*Sassafras albidum*).
- Satin willow (*Salix sitchensis*).
- Satin-curls (*Clematis catesbyana*).
- Saw,
  - brier (*Smilax glauca*).
  - palmetto (*Serenoa repens*).
- Scabland sagebrush (*Artemisia arbuscula*, *Artemisia rigida*).
- Scale broom (*Lepidospartum squamatum*).
- Scarlet,
  - buckeye (*Aesculus discolor*, *Aesculus pavia*).
  - oak (*Quercus coccinea*).
- Scentless syringa (*Philadelphus inodorus*).
- Schneck red oak (*Quercus shumardii*).
- Schwerin's indigo (*Amorpha schwerinii*).
- Scotch broom (*Cytisus scoparius*).
- Screwbean (*Prosopis cinerascens*, *Prosopis pubescens*).
- Screwpod mesquite (*Prosopis pubescens*).
- Scrub,
  - birch (*Betula glandulosa*).
  - ceanothus (*Ceanothus foliosus*).
  - chestnut oak (*Quercus prinoides*).
  - hickory (*Carya floridana*).
  - oak (*Quercus macrocarpa*, *Quercus marilandica*, *Quercus prinoides*).
  - pine (*Pinus banksiana*, *Pinus virginiana*).
- Sea oxeye (*Borrichia frutescens*).
- Sea-ash (*Xanthoxylum clara-herculis*).
- Seaside alder (*Alnus maritima*).
- Seepwillow (*Baccharis glutinosa*).
- Senna (*Cassia armata*, *Cassia covesii*).
- September elm (*Ulmus serotina*).
- Sequoia (*Sequoia washingtoniana*).
- Serviceberry, (*Amelanchier oblongifolia*, *Amelanchier sanguinea*).
  - Canada (*Amelanchier canadensis*).
- Serviceberry—Continued.
  - Cluster (*Amelanchier polycarpa*).
  - Cusick (*Amelanchier cusickii*).
  - Downy (*Amelanchier canadensis*).
  - Dwarf (*Amelanchier oblongifolia*).
  - Goldman (*Amelanchier goldmanii*).
  - Small (*Amelanchier humilis*).
  - Smooth (*Amelanchier laevis*).
  - Utah (*Amelanchier utahensis*).
  - Western (*Amelanchier alnifolia*, *Amelanchier florida*).
- Seven-bark (*Hydrangea arborescens*, *Hydrangea quercifolia*).
- Sevenleaf ivy (*Parthenocissus heptaphylla*).
- Shadblow (*Amelanchier canadensis*).
- Shadbush (*Amelanchier canadensis*).
- Shadscale (*Atriplex canescens*, *Atriplex confertifolia*).
- Shagbark hickory (*Carya ovata*).
- Shankbush (*Adenostoma sparsifolium*).
- Shasta red fir (*Abies magnifica*).
- She-balsam (*Abies fraseri*).
- Sheepberry (*Viburnum lentago*, *Viburnum prunifolium*).
- Sheep-currant (*Ribes cereum*).
- Sheep laurel (*Kalmia angustifolia*).
- Sheep-nut (*Simmondsia chinensis*).
- Sheep-sage (*Eriogonum microthecum*).
- Shellbark hickory (*Carya ovata*).
- Shin oak (*Quercus mohriana*, *Quercus undulata*).
- Shingle oak (*Quercus imbricaria*).
- Shining,
  - bumelia (*Bumelia lucida*).
  - sumac (*Rhus copallina*).
  - willow (*Salix lucida*).
  - withe-rod (*Viburnum nitidum*).
- Shinnery oak (*Quercus havardii*).
- Shiny willow (*Salix lucida*).
- Shipmast locust (*Robinia pseudoacacia*).
- Shittimwood (*Bumelia lanuginosa*, *Bumelia lycioides*).
- Shoestrings (*Amorpha canescens*, *Campsis radicans*).
- Shore,
  - pine (*Pinus contorta*).
  - plum (*Prunus maritima*).
- Short shucks (*Pinus virginiana*).
- Shortflower pentstemon (*Pentstemon breviflorus*).
- Shortleaf pine (*Pinus echinata*, *Pinus taeda*).
- Shortspine horsebrush (*Tetradymia spinosa*).
- Shrub, (*Calycanthus floridus*).
  - yellow-root (*Xanthorriza simplicissima*).
- Shrubby,
  - blue sage (*Salvia ballotaeflora*).
  - buckeye (*Aesculus glabra*).
  - cinquefoil (*Potentilla fruticosa*).
  - croton (*Croton fruticulosus*).
  - St. Johnswort (*Hypericum prolificum*).

Shumard red oak (*Quercus shumardii*).
Sierra,
  bearberry (*Arctostaphylos nevadensis*).
  bladdernut (*Staphylea bolanderi*).
  coffeeberry (*Rhamnus rubra*).
  currant (*Ribes nevadense*).
  gooseberry (*Ribes roezlii*).
  maple (*Acer glabrum*).
  plum (*Prunus subcordata*).
  sweet bay (*Myrica hartwegii*).
  willow (*Salix commutata,*
    Salix orestera).
Silkbay (*Persea humilis*).
Silktassel,
  Coast (*Garrya elliptica*).
  Fremont (*Garrya fremontii*).
  Pale (*Garrya flavescens*).
  Veatch (*Garrya veatchii*).
  Yellowleaf (*Garrya flavescens*).
Silktassel bush (*Garrya elliptica,*
    Garrya lindheimeri).
Silktree (*Albizzia julubrissin*).
Silky,
  camellia (*Stuartia malachodendron*).
  cornel (*Cornus amomum*).
  willow (*Salix sericea,*
    Salix sitchensis).
Silver,
  birch (*Betula lutea,*
    Elaeagnus argentea).
  bush (*Elaeagnus argentea*).
  bush, desert (*Shepherdia rotundifolia*).
  chain (*Robinia pseudoacacia*).
  fir (*Abies amabilis,*
    Abies concolor,
    Abies grandis).
  lupine (*Lupinus albifrons*).
  maple (*Acer saccharinum*).
  mountain-mahogany (*Cercocarpus argenteus*).
  oak (*Quercus hypoleuca*).
  poplar (*Populus alba*).
  sagebrush (*Artemisia cana*).
  willow (*Salix argyrocarpa,*
    Salix discolor,
    Salix geyeriana).
Silverbell, (*Halesia carolina*).
  Little (*Halesia parviflora*).
  Mountain (*Halesia monticola*).
  Two-wing (*Halesia diptera*).
Silverbell tree (*Halesia carolina*).
Silverberry (*Elaeagnus argentea*).
Silverleaf,
  hydrangea (*Hydrangea radiata*).
  willow (*Salix argophylla*).
Silverling (*Baccharis halimifolia*).
Silvery wormwood (*Artemisia filifolia*).
Single spruce (*Picea canadensis*).
Singleleaf pine (*Pinus monophylla*).
Sitka,
  alder (*Alnus sinuata*).
  cypress (*Chamaecyparis nootkatensis*).
Sitka—Continued.
  spruce (*Picea sitchensis*).
  willow (*Salix sitchensis*).
Skunk,
  bush (*Rhus trilobata*).
  currant (*Ribes bracteosum,*
    Ribes glandulosum,
    Ribes prostratum).
  spruce (*Picea canadensis*).
Slash pine (*Pinus caribaea,*
    Pinus palustris).
Slender,
  buckwheatbrush (*Eriogonum microthecum*).
  poreleaf (*Porophyllum gracile*).
  willow (*Salix exigua*).
Slick oak (*Quercus velutina*).
Slickbark oak (*Quercus velutina*).
Slippery elm, (*Ulmus fulva*).
  California (*Fremontia californica*).
Sloe (*Prunus umbellata,*
    Viburnum prunifolium).
Small,
  chestnut oak (*Quercus prinoides*).
  cranberry (*Vaccinium oxycoccus*).
  pignut hickory (*Carya microcarpa,*
    Carya ovalis).
  post oak (*Quercus margaretta*).
  sagebrush (*Artemisia nova*).
  serviceberry (*Amelanchier humilis*).
  viburnum (*Viburnum obovatum*).
Small's hackberry (*Celtis smallii*).
Small-flowered,
  mountain-mahogany (*Cercocarpus minutiflorus*).
  papaw (*Asimina parviflora*).
Small-fruited,
  hickory (*Carya microcarpa*).
  papaw (*Asimina parviflora*).
Small-leaf,
  mahogany (*Cercocarpus intricatus*).
  mockorange (*Philadelphus microphyllus*).
Small-leaved horsebean (*Parkinsonia microphylla*).
Smilax (*Smilax lanceolata*).
Smith buckthorn (*Rhamnus smithii*)
Smoketree (*Cotinus americanus,*
    Parosela spinosa).
Smooth,
  alder (*Alnus rugosa*).
  ash (*Fraxinus velutina*).
  azalea (*Rhododendron arborescens*).
  clematis (*Clematis addisonii*).
  cottonwood (*Populus acuminata*).
  cypress (*Cupressus glabra*).
  gooseberry (*Ribes oxyacanthoides,*
    Ribes rotundifolium).
  hydrangea (*Hydrangea arborescens*).
  labrador tea (*Ledum glandulosum*).
  redbay (*Persea borbonia*).
  serviceberry (*Amelanchier laevis*).
  sumac (*Rhus glabra*).
  willow (*Salix laevigata*).
  winterberry (*Ilex laevigata*).
  withe rod (*Viburnum nudum*).

- Smoothbark,
  - cottonwood (*Populus acuminata*).
  - oak (*Quercus velutina*).
- Snailseed (*Cebatha carolina*, *Cocculus diversifolius*).
- Snap willow (*Salix fragilis*).
- Snapdragon pentstemon (*Pentstemon antirrhinoides*).
- Snow gooseberry (*Ribes niveum*).
- Snowbell (*Styrax grandifolia*).
- Snowberry, (*Symphoricarpos albus*).
  - Mountain (*Symphoricarpos oreophilus*).
  - Roundleaf (*Symphoricarpos rotundifolius*).
  - Utah (*Symphoricarpos utahensis*).
  - Western (*Symphoricarpos occidentalis*).
  - Whortleleaf (*Symphoricarpos rotundifolius*).
- Snowbrush (*Ceanothus cordulatus*, *Ceanothus velutinus*).
- Snowdrop, (*Halesia carolina*).
  - tree (*Halesia diptera*).
- Snowflower tree (*Chionanthus virginica*).
- Snowy hydrangea (*Hydrangea radiata*).
- Soapberry,
  - Drummond (*Sapindus drummondii*).
  - Florida (*Sapindus marginatus*).
  - Western (*Sapindus drummondii*).
- Soapbush (*Porlieria angustifolia*).
- Soft,
  - arrowwood (*Viburnum molle*).
  - maple (*Acer rubrum*, *Acer saccharinum*).
- Softleaf,
  - arrowwood (*Viburnum molle*).
  - willow (*Salix sessilifolia*).
- Soldier berry (*Ribes aureum*).
- Solonis grape (*Vitis longii*).
- Sonora ironwood (*Olneya tesota*).
- Sophora, pink (*Sophora affinis*).
- Sorrel-tree (*Oxydendrum arboreum*).
- Soulard crab apple (*Malus soulardii*).
- Sour,
  - berry (*Rhus integrifolia*).
  - buffaloberry (*Shepherdia argentea*).
  - cherry (*Prunus cerasus*).
  - gum (*Nyssa sylvatica*).
  - oak (*Rhus integrifolia*).
  - tupelo (*Nyssa ogeche*).
  - tupelo gum (*Nyssa ogeche*).
- Sour-top blueberry (*Vaccinium canadense*).
- Sourwood (*Oxydendrum arboreum*).
- Southern,
  - balsam fir (*Abies fraseri*).
  - black gum (*Nyssa biflora*).
  - blackhaw (*Viburnum rufidulum*).
  - buckthorn (*Bumelia lycioides*).
  - California black walnut (*Juglans californica*).
  - cypress (*Taxodium distichum*).
  - fox grape (*Vitis rotundifolia*).
- Southern—Continued.
  - gooseberry (*Vaccinium melanocarpum*).
  - hackberry (*Celtis mississippiensis*).
  - hard pine (*Pinus australis*).
  - magnolia (*Magnolia grandiflora*).
  - pine (*Pinus australis*).
  - prickly-ash (*Xanthoxylum clava-herculis*).
  - redcedar (*Juniperus lucayana*).
  - red oak (*Quercus rubra*).
  - shagbark hickory (*Carya carolinae-septentrionalis*).
  - spicebush (*Benzoin melissaefolium*).
  - spruce (*Picea australis*).
  - sugar maple (*Acer floridanum*).
  - white cedar (*Chamaecyparis thyoides*).
  - wild cherry (*Prunus australis*).
  - witch-hazel (*Hamamelis macrophylla*).
  - yellow pine (*Pinus echinata*).
- Southwestern black cherry (*Prunus virens*).
- Spanish,
  - bayonet (*Yucca* spp.).
  - buckeye (*Ungnadia speciosa*).
  - dagger (*Yucca* spp.).
  - grape (*Vitis berlandieri*).
  - oak (*Quercus coccinea*, *Quercus digitata*, *Quercus rubra*).
- Sparkleberry (*Vaccinium arboreum*).
- Speckled alder (*Alnus incana*).
- Spicebush (*Benzoin aestivale*, *Myrica cerifera*).
- Spineless hop sage (*Graysia brandegei*).
- Spinescale (*Atriplex spinifera*).
- Spiny,
  - greasebush (*Forsellesia spinescens*).
  - hackberry (*Celtis pallida*).
  - hop-sage (*Grayia spinosa*).
  - myrtle (*Caenothus spinosus*).
  - saltbush (*Atriplex confertifolia*).
- Spiraea,
  - Douglas (*Spiraea douglasii*).
  - Dwarf (*Spiraea caespitosa*).
  - Meadow (*Spiraea alba*).
  - Virginia (*Spiraea virginiana*).
  - Willowleaf (*Spiraea salicifolia*).
- Sponge wood (*Acacia farnesiana*).
- Spoonwood (*Kalmia latifolia*).
- Spotted,
  - bark (*Quercus shumardii*).
  - oak (*Quercus coccinea*, *Quercus nigra*, *Quercus shumardii*, *Quercus texana*).
- Spring rabbitbrush (*Tetradymia glabrata*).
- Spruce (*Tsuga canadensis*).
  - Alberta (*Picea albertiana*).
  - Bigcone (*Pseudotsuga macrocarpa*).
  - Black (*Picea mariana*).
  - Blue (*Picea pungens*).

- Spruce—Continued.
  - Bog (*Picea mariana*).
  - Brewer (*Picea breweriana*).
  - Cat (*Picea canadensis*).
  - Colorado blue (*Picea pungens*).
  - Double (*Picea mariana*).
  - Douglas (*Pseudotsuga glauca*, *Pseudotsuga taxifolia*).
  - Engelmann (*Picea engelmannii*).
  - Lemlock (*Tsuga canadensis*).
  - Red (*Picea rubra*).
  - Single (*Picea canadensis*).
  - Sitka (*Picea sitchensis*).
  - Skunk (*Picea canadensis*).
  - Southern (*Picea australis*).
  - Tideland (*Picea sitchensis*).
  - Weeping (*Picea breweriana*).
  - Western white (*Picea albertiana*).
  - White (*Picea canadensis*, *Picea engelmannii*).
- Spruce pine (*Picea mariana*, *Pinus contorta*, *Pinus glabra*, *Tsuga canadensis*).
- Squashberry (*Viburnum acerifolium*, *Viburnum pauciflorum*).
- Squaw,
  - apple (*Peraphyllum ramosissimum*).
  - bush (*Rhus trilobata*).
  - carpet (*Ceanothus prostratus*).
  - currant (*Ribes cereum*).
  - desert-thorn (*Lycium torreyi*).
  - huckleberry (*Vaccinium stamineum*).
  - mat (*Ceanothus prostratus*).
  - thorn (*Lycium torreyi*).
- Stagbush (*Viburnum prunifolium*).
- Stagger bush (*Xolisma mariana*).
- Staghorn sumac (*Rhus glabra*, *Rhus hyphina*).
- Starleaf (*Choisya dumosa*).
- Steeplebush (*Spiraea tomentosa*).
- Sticky,
  - currant (*Ribes viscosissimum*).
  - laurel (*Ceanothus velutinus*).
  - rabbitbrush (*Chrysothamnus paniculatus*).
- Stickyflower rabbitbrush (*Chrysothamnus viscidiflorus*).
- Stiff,
  - cornel (*Cornus foemina*).
  - dogwood (*Cornus femina*).
  - sagebrush (*Artemisia rigida*).
- Stink currant (*Ribes bracteosum*).
- Stinking,
  - buckeye (*Aesculus glabra*).
  - cedar (*Tumion taxifolium*).
  - fir (*Abies grandis*).
  - willow (*Amorpha californica*).
- Stinkwood (*Nyssa sylvatica*).
- Stone pine, Mexican (*Pinus cembroides*).
- Storax, (*Styrax officinalis*).
  - American (*Styrax americana*).
  - Downy (*Styrax pulverulenta*).
  - Powdery (*Styrax pulverulenta*).
  - Sycamoreleaf (*Styrax platanifolia*).
- Straggle bush (*Ribes divaricatum*).
- Straggly gooseberry (*Ribes divaricatum*).
- Strawberry,
  - bush (*Evonymus americanus*).
  - bush, running (*Evonymus obovatus*).
  - shrub (*Calycanthus floridus*).
- Stretch-berry (*Smilax bona-nox*).
- Striped maple (*Acer pennsylvanicum*).
- Styrax (*Styrax americana*).
- Sugar,
  - blueberry (*Vaccinium angustifolium*).
  - bush (*Rhus ovata*).
  - grape (*Vitis monticola*, *Vitis rupestris*).
  - maple (*Acer saccharum*).
  - maple, black (*Acer nigrum*).
  - pine (*Pinus lambertiana*).
  - sumac (*Rhus ovata*).
  - tree (*Acer saccharum*).
- Sugarberry (*Celtis mississippiensis*, *Celtis occidentalis*, *Ehretia anacua*).
- Sumac,
  - Dwarf (*Rhus copallina*).
  - Evergreen (*Rhus virens*).
  - Fragrant (*Rhus aromatica*).
  - Laurel (*Rhus laurina*).
  - Lemonade (*Rhus trilobata*).
  - Mahogany (*Rhus integrifolia*).
  - Michaux (*Rhus michauxii*).
  - Mountain (*Rhus copallina*).
  - Poison (*Rhus vernix*).
  - Shining (*Rhus copallina*).
  - Smooth (*Rhus glabra*).
  - Staghorn (*Rhus glabra*, *Rhus typhina*).
  - Sugar (*Rhus ovata*).
  - Swamp (*Rhus vernix*).
  - Utah (*Rhus trilobata*).
  - Winged (*Rhus copallina*).
  - Yellow (*Rhus glabra*).
- Summer grape (*Vitis argentifolia*).
- Supplejack (*Berchemia scandens*).
- Suterberry (*Xanthoxylum americanum*).
- Swamp,
  - ash (*Fraxinus caroliniana*).
  - azalea (*Rhododendron viscosum*).
  - bay (*Persea pubescens*).
  - birch (*Betula fontinalis*, *Betula pumila*).
  - black gum (*Nyssa biflora*).
  - blueberry (*Vaccinium corymbosum*).
  - blueberry, downy (*Vaccinium atrococcum*).
  - candleberry (*Myrica carolinensis*).
  - chestnut oak (*Quercus prinus*).
  - cottonwood (*Populus heterophylla*).
  - currant (*Ribes lacustre*).
  - fly-honeysuckle (*Lonicera oblongifolia*).
  - gooseberry (*Ribes lacustre*).
  - haw (*Viburnum cassinoides*, *Viburnum nudum*).

Swamp—Continued.
  hickory (*Carya cordiformis*).
  ironwood (*Cyrilla racemiflora*).
  laurel (*Kalmia polifolia, Magnolia virginiana*).
  magnolia (*Magnolia virginiana*).
  maple (*Acer rubrum*).
  oak (*Quercus bicolor, Quercus palustris*).
  pine (*Pinus caribaea, Pinus palustris*).
  post oak (*Quercus lyrata*).
  privet (*Forestiera acuminata*).
  redbay (*Persea pubescens*).
  sassafras (*Magnolia virginiana*).
  Spanish oak (*Quercus palustris*).
  sumac (*Rhus vernix*).
  white oak (*Quercus bicolor, Quercus prinus*).
  willow (*Salix nigra*).
  wood (*Dirca palustris*).
Sweet,
  acacia (*Acacia farnesiana*).
  azalea (*Rhododendron arborescens*).
  birch (*Betula lenta, Ceanothus parvifolius*).
  buckeye (*Aesculus octandra*).
  cherry (*Prunus avium*).
  crab apple (*Malus coronaria*).
  haw (*Viburnum prunifolium*).
  laurel (*Illicium floridanum*).
  magnolia (*Magnolia virginiana*).
  mountain grape (*Vitis monticola*).
  pepperbush (*Clethra alnifolia*).
  pepperbush, mountain (*Clethra acuminata*).
  viburnum (*Viburnum lentago*).
  winter grape (*Vitis cinerea*).
Sweetbay (*Magnolia virginiana, Persea borbonia, Symplocos tinctoria*).
Sweet-bush (*Cercocarpus betuloides*).
Sweetfern (*Myrica asplenifolia*).
Sweetgale (*Myrica gale*).
Sweetgum (*Liquidambar styraciflua*).
Sweetleaf (*Symplocos tinctoria*).
Sweetspire (*Itea virginica*).
Switch oak (*Quercus undulata*).
Switch-ivy (*Leucothoë catesbaei*).
Switch-sorrel (*Dodonaea arizonica*).
Sycamore (*Platanus occidentalis*).
  Arizona (*Platanus wrightii*).
  California (*Platanus racemosa*).
  Western (*Platanus racemosa*).
Sycamoreleaf storax (*Styrax platanifolia*).
Syringa (*Philadelphus lewisii, Philadelphus serpyllifolius*).
Table-mountain pine (*Pinus pungens*).
Tacamahac (*Populus balsamifera*).
Tag alder (*Alnus tenuifolia*).
Tall,
  bilberry (*Vaccinium ovalifolium*).
  inkberry (*Ilex coriacea*).
  red huckleberry (*Vaccinium parvifolium*).
Tamarack (*Larix laricina, Larix lyalli*).
  pine (*Pinus murrayana*).
Tamarisk (*Tamarix gallica*).
Tanbark oak (*Lithocarpus densiflora, Quercus montana, Quercus velutina*).
Tan bay (*Gordonia lasianthus*).
Tanoak (*Lithocarpus densiflora*).
Tansy-bush (*Chamaebatiaria millefolium*).
Taparosa (*Anisacanthus thurberi*).
Taray (*Salix taxifolia*).
Tarbush (*Chamaebatia foliolosa, Flourensia cernua*).
Tarflower (*Befaria racemosa*).
Tarweed (*Chamaebatia foliolosa*).
Tassel bush,
  Canyon (*Garrya veatchii*).
  Dwarf (*Garrya flavescens*).
  Utah (*Garrya flavescens*).
Tasseltree (*Garrya elliptica*).
Tassel-white (*Itea virginica*).
Tea, Mormon (*Ephedra viridis*).
Teaberry (*Gaultheria procumbens*).
Tealeaf willow (*Salix planifolia*).
Tecate cypress (*Cupressus guadeloupensis*).
Tennessee-indigo (*Amorpha tennesseensis*).
Tepopote (*Ephedra antisyphilitica, Ephedra trifurca*).
Tesota (*Olneya tesota*).
Texan,
  pecan (*Carya texana*).
  sloe (*Prunus tarda*).
Texas,
  almond (*Prunus minutiflora*).
  ash (*Fraxinus texensis*).
  catclaw (*Acacia wrightii*).
  cottonwood (*Populus texana*).
  ebony (*Pithecolobium flexicaule*).
  elm (*Ulmus crassifolia*).
  hickory (*Carya buckleyi*).
  jointfir (*Ephedra texana*).
  madrone (*Arbutus texana*).
  mallow (*Malvaviscus drummondii*).
  mulberry (*Morus microphylla*).
  palm (*Sabal texana*).
  redbud (*Cercis reniformis*).
  red oak (*Quercus texana*).
  sarsaparilla (*Menispermum canadense*).
  virgins-bower (*Clematis drummondii*).
  walnut (*Juglans rupestris*).
Thick-leaved hackberry (*Celtis reticulata*).
Thinleaf,
  alder (*Alnus sinuata, Alnus tenuifolia*).
  huckleberry (*Vaccinium membranaceum*).
Thunberg barberry (*Berberis thunbergii*).
Thunderwood (*Rhus vernix*).

Thurberia (*Thurberia triloba*).
Thorn,
  Box (*Lycium halimifolium*).
  California box (*Lycium californicum*).
  Fire (*Cotoneaster pyracantha*).
  Rabbit (*Lycium pallidum*).
  Squaw (*Lycium torreyi*).
Thorn,
  polygala (*Polygala acanthoclada*).
  tree (*Gleditsia triacanthos*).
Thorny ash (*Aralia spinosa*).
Threetip sagebrush (*Artemisia tripartita*).
Tideland spruce (*Picea sitchensis*).
Tight-eye (*Cyrilla racemiflora*).
Tisswood (*Halesia carolina*,
  Persea borbonia).
Titi, (*Cliftonia monophylla*).
  Black (*Cliftonia monophylla*,
  Cyrilla racemiflora).
Tobacco, tree (*Nicotiana glauca*).
Tobbaco brush (*Ceanothus velutinus*).
Tomatilla (*Lycium pallidum*,
  Lycium torreyi).
Toothache tree (*Aralia spinosa*).
Torchwood (*Amyris texana*).
Tornillo (*Prosopis pubescens*).
Torote (*Bursera microphylla*).
Torrey,
  jointfir (*Ephedra torreyana*).
  lenscale (*Atriplex torreyi*).
  pine (*Pinus torreyana*).
Tough buckthorn (*Bumelia tenax*).
Toumey oak (*Quercus toumeyi*).
Toyon (*Photinia arbutifolia*).
Trailing,
  bluebrush (*Ceanothus diversifolius*).
  ceanothus (*Ceanothus diversifolius*).
Tramp's trouble (*Smilax bona-nox*).
Trask mahogany (*Cercocarpus traskiae*).
Tree,
  catclaw (*Acacia wrightii*).
  huckleberry (*Vaccinium arboreum*).
  lupine (*Lupinus arboreus*).
  pea (*Parosela spinosa*).
  tobacco (*Nicotiana glauca*).
Treebine (*Cissus incisa*).
Tree-of-heaven (*Ailanthus altissima*).
Treemallow, California (*Lavatera assurgentifolia*).
Treepoppy (*Dendromecon rigida*).
Trembling aspen (*Populus tremuloides*).
Trumpet honeysuckle (*Lonicera sempervirens*).
Trumpetcreeper (*Campsis radicans*).
Trumpetflower (*Bignonia capreolata*,
  Campsis radicans,
  Tecoma stans).
Tuliptree (*Liriodendron tulipifera*).
Tupelo, (*Nyssa aquatica*,
  Nyssa sylvatica).
  gum (*Nyssa aquatica*).
  gum, large (*Nyssa aquatica*).
Tupelo—Continued.
  gum, sour (*Nyssa ogeche*).
  Sour (*Nyssa ogeche*).
  Water (*Nyssa biflora*,
  Nyssa ogeche).
Turkey,
  grape (*Vitis lincecumii*).
  oak (*Quercus cinerea*,
  Quercus ilicifolia,
  Quercus rubra).
  shed (*Forestiera pubescens*).
Turpentine broom (*Thamnosma montana*).
Turpentineweed (*Gutierrezia linearis*,
  Gutierrezia longifolia).
Tweedy cottonwood (*Populus tweedyi*).
Twinberry, (*Mitchella repens*).
  Red (*Lonicera utahensis*).
Twinberry honeysuckle (*Lonicera involucrata*).
Twinflower (*Linnaea borealis*).
Two-wing silverbell (*Halesia diptera*).
Umbrella magnolia (*Magnolia tripetala*).
Umbrella tree, (*Cornus alternifolia*,
  Magnolia tripetala).
  Ear-leaved (*Magnolia fraseri*).
  Large-leaved (*Magnolia macrophylla*).
Una de gato (*Acacia greggii*).
Undergreen willow (*Salix commutata*).
Unknown tree (*Celtis occidentalis*).
Upland willow oak (*Quercus cinerea*).
Utah,
  buddleia (*Buddleia utahensis*).
  honeysuckle (*Lonicera utahensis*).
  juniper (*Juniperus utahensis*).
  serviceberry (*Amelanchier utahensis*).
  snowberry (*Symphoricarpos utahensis*).
  sumac (*Rhus trilobata*).
  tassel bush (*Garrya flavescens*).
Valley,
  cottonwood (*Populus wislizenii*).
  white oak (*Quercus lobata*).
  willow (*Salix hindsiana*).
Varnish-brush (*Ceanothus velutinus*).
Vase-vine (*Clematis viorna*).
Vasey oak (*Quercus undulata*).
Vauquelinia (*Vauquelinia californica*).
Veatch silktassel (*Garrya veatchii*).
Veiny arrowwood (*Virburnum venosum*).
Veinyleaf hollygrape (*Berberis nervosa*).
Velvet,
  ash (*Fraxinus velutina*).
  mesquite (*Prosopis odorata*).
Velvetleaf,
  blueberry (*Vaccinium canadense*).
  elder (*Sambucus coerulea*).
Velvetpod mimosa (*Mimosa aysocarpa*).

Viburnum,
  Downy (*Viburnum pubescens*).
  Kentucky (*Viburnum molle*).
  Maple-leaf (*Viburnum acerifolium*).
  Missouri (*Viburnum affine*).
  Oregon (*Viburnum ellipticum*).
  Small (*Viburnum obovatum*).
  Sweet (*Viburnum lentago*).
Victor gooseberry (*Ribes victoris*).
Vine maple (*Acer circinatum*).
Virginia,
  clematis (*Clematis virginiana*).
  creeper (*Parthenocissus quinquefolia*,
    Parthenocissus vitacea).
  pine (*Pinus virginiana*).
  spiraea (*Spiraea virginiana*).
  willow (*Itea virginica*).
Virgins-bower, (*Clematis ligusticifolia*).
  Purple (*Clematis verticillaris*).
  Texas (*Clematis drummondii*).
Viscid currant (*Ribes viscosissimum*).
Wacopy (*Dirca palustris*).
Wafer-ash (*Ptelea trifoliata*).
Wahoo (*Evonymus occidentalis*,
    Ulmus alata).
Walnut,
  Arizona (*Juglans major*).
  Black (*Juglans nigra*).
  California (*Juglans californica*).
  California black (*Juglans hindsii*).
  Desert (*Juglans rupestris*).
  Hinds (*Juglans hindsii*).
  Little (*Juglans rupestris*).
  Southern California black (*Juglans californica*).
  Texas (*Juglans rupestris*).
  Western (*Juglans rupestris*).
  White (*Juglans cinerea*).
Ward willow (*Salix longipes*).
Wartystem ceanothus (*Ceanothus verrucosus*).
Water,
  ash (*Fraxinus caroliniana*,
    Fraxinus pauciflora).
  beech (*Carpinus caroliniana*).
  birch (*Betula fontinalis*,
    Betula nigra).
  bitternut (*Carya aquatica*).
  elm (*Ulmus americana*).
  gum (*Nyssa biflora*).
  hickory (*Carya aquatica*).
  jacket (*Lycium andersonii*).
  maple (*Acer rubrum*).
  oak (*Quercus arkansana*,
    Quercus imbricaria,
    Quercus laurifolia,
    Quercus nigra,
    Quercus palustris,
    Quercus phellos).
  sage (*Atriplex torreyi*).
  tupelo (*Nyssa biflora*,
    Nyssa ogeche).
  white oak (*Quercus lyrata*).
Water-elm (*Planera aquatica*).
Waterlocust (*Gleditsia aquatica*).
Water-wally (*Baccharis glutinosa*).
Waterwillow (*Baccharis emoryi*).
Watson gooseberry (*Ribes watsonianum*).
Wavyleaf,
  ceanothus (*Ceanothus foliosus*).
  hollygrape (*Berberis pinnata*).
  oak (*Quercus undulata*).
Wax currant (*Ribes cereum*).
Waxberry (*Myrica cerifera*).
Waxmyrtle, (*Myrica cerifera*).
  Pacific (*Myrica californica*).
Wedgeleaf,
  ceanothus (*Ceanothus cuneatus*).
  goldenbush (*Aplopappus cuneatus*).
  hornbrush (*Ceanothus cuneatus*).
Weeping,
  oak (*Quercus lobata*).
  spruce (*Picea breweriana*).
Western,
  alder (*Alnus rubra*).
  azalea (*Rhododendron occidentale*).
  black currant (*Ribes laxiflorum*).
  blackhaw (*Viburnum ellipticum*).
  black willow (*Salix lasiandra*).
  blueberry (*Vaccinium occidentale*).
  bog blueberry (*Vaccinium occidentale*).
  buckeye (*Aesculus glabra*).
  burningbush (*Evonymus occidentalis*).
  catalpa (*Catalpa speciosa*).
  chokecherry (*Prunus demissa*).
  chokecherry, black (*Prunus demissa*).
  cottonwood (*Populus sargentii*).
  crab apple (*Malus fusca*,
    Malus ioensis).
  dogwood (*Cornus nuttallii*).
  hackberry (*Celtis reticulata*).
  hemlock (*Tsuga heterophylla*).
  hophornbeam (*Ostrya knowltonii*).
  huckleberry (*Vaccinium occidentale*).
  juneberry (*Amelanchier alnifolia*).
  juniper (*Juniperus occidentalis*).
  larch (*Larix occidentalis*).
  leatherwood (*Dirca occidentalis*).
  mountain-ash (*Sorbus sitchensis*).
  osier (*Cornus occidentalis*).
  paper birch (*Betula papyrifera*).
  redbud (*Cercis occidentalis*).
  redcedar (*Thuja plicata*).
  sand cherry (*Prunus besseyi*).
  serviceberry (*Amelanchier alnifolia*,
    Amelanchier florida).
  snowberry (*Symphoricarpos occidentalis*).
  soapberry (*Sapindus drummondii*).
  sugar maple (*Acer grandidentatum*).
  sycamore (*Platanus racemosa*).
  walnut (*Juglans rupestris*).
  white pine (*Pinus monticola*).
  white spruce (*Picea albertiana*).
  wild grape (*Vitis californica*).
  wild plum (*Prunus subcordata*).

Western—Continued.
  yellow pine (*Pinus ponderosa*).
  yew (*Taxus brevifolia*).
Wheatbrush (*Cliftonia monophylla*).
Whin (*Genista tinctoria*).
White,
  alder (*Alnus rhombifolia, Clethra acuminata, Clethra alnifolia*).
  ash (*Fraxinus americana*).
  ash, Biltmore (*Fraxinus biltmoreana*).
  azalea (*Rhododendron viscosum*).
  basswood (*Tilia heterophylla*).
  bee-sage (*Salvia apiana*).
  birch (*Betula papyrifera, Betula populifolia*).
  brush (*Lippia ligustrina*).
  burrobrush (*Hymenoclea salsola*).
  bur-sage (*Franseria dumosa*).
  cedar (*Chamaecyparis lawsoniana, Libocedrus decurrens, Thuja occidentalis*).
  cedar, northern (*Thuja occidentalis*).
  cedar, southern (*Chamaecyparis thyoides*).
  cornel (*Cornus foemina*).
  cypress (*Taxodium distichum*).
  dalea (*Parosela emoryi*).
  elm (*Ulmus americana*).
  fir (*Abies concolor, Abies grandis, Abies lasiocarpa*).
  fir, Colorado (*Abies concolor*).
  fringe (*Chionanthus virginica*).
  gooseberry (*Ribes inerme*).
  hickory (*Carya alba*).
  laburnum (*Robinia pseudoacacia*).
  lilac (*Ceanothus integerrimus*).
  locust (*Robinia pseudoacacia*).
  maple (*Acer saccharinum*).
  mulberry (*Morus alba*).
  oak (*Quercus alba, Quercus durandii, Quercus oblongifolia, Quercus stellata*).
  pine (*Pinus flexilis, Pinus glabra, Pinus strobus*).
  poplar (*Liriodendron tulipifera, Populus alba*).
  ratany (*Krameria grayi*).
  sage (*Eurotia lanata, Salvia apiana*).
  spruce (*Picea canadensis, Picea engelmannii*).
  swamp honeysuckle (*Rhododendron viscosum*).
  walnut (*Juglans cinerea*).
  willow (*Salix lasiolepis*).
  willow, European (*Salix alba*).
White-back ceanothus (*Ceanothus crassifolius*).
Whitebark,
  maple (*Acer leucoderme*).
  pine (*Pinus albicaulis*).
  soapbloom (*Ceanothus leucodermis*).
White-bay (*Magnolia virginiana*).
White-flowered,
  azalea (*Rhododendron albiflorum*).
  lantana (*Lantana involucrata*).
Whiteheart hickory (*Carya alba*).
Whiteleaf,
  manzanita (*Arctostaphylos viscida*).
  oak (*Quercus hypoleuca*).
Whitestem,
  gooseberry (*Ribes inerme*).
  pine (*Pinus albicaulis*).
Whitethorn, (*Ceanothus cordulatus, Ceanothus incanus*).
  Chaparral (*Ceanothus leucodermis*).
  Coast (*Ceanothus incanus*).
  Mountain (*Ceanothus cordulatus*).
White-wicky (*Kalmia cuneata*).
Whitewood (*Liriodendron tulipifera*).
Whortleberry,
  Big (*Vaccinium membranaceum*).
  Blue (*Vaccinium ovalifolium*).
  Bog (*Vaccinium uliginosum*).
  Dwarf (*Vaccinium caespitosum*).
  Great (*Vaccinium corymbosum*).
  Grouse (*Vaccinium scoparium*).
  Red (*Vaccinium parvifolium*).
  Rocky mountain (*Vaccinium oreophilum*).
Whortleleaf snowberry (*Symphoricarpos rotundifolius*).
Wicky (*Kalmia angustifolia, Kalmia carolina, Kalmia hirsuta*).
Wilcox oak (*Quercus wilcoxii*).
Wild,
  allspice (*Benzoin aestivale*).
  apple (*Malus pumila, Peraphyllum ramosissimum*).
  bamboo (*Smilax auriculata*).
  black cherry (*Prunus serotina*).
  black currant (*Ribes floridum*).
  box (*Gyminda latifolia*).
  cherry (*Prunus emarginata, Prunus serotina*).
  china (*Sapindus marginatus*).
  cotton, Arizona (*Thurberia triloba*).
  crapemyrtle (*Malpighia glabra*).
  grape (*Vitis girdiana*).
  grape, California (*Vitis californica*).
  grape, western (*Vitis californica*).
  hazel (*Simmondsia chinensis*).
  hydrangea (*Hydrangea arborescens*).
  laurel (*Symplocos tinctoria*).
  lilac (*Ceanothus leucodermis*).
  lime (*Xanthoxylum fagara*).
  olive (*Osmanthus americana*).
  olive tree (*Halesia carolina*).
  orange (*Prunus caroliniana*).
  peach (*Prunus caroliniana, Prunus texana*).
  pepper (*Ceanothus americanus*).
  plum (*Prunus americana, Prunus lanata, Prunus nigra*).
  plum, garden (*Prunus hortulana*).
  raisin (*Viburnum cassinoides, Viburnum lentago*).

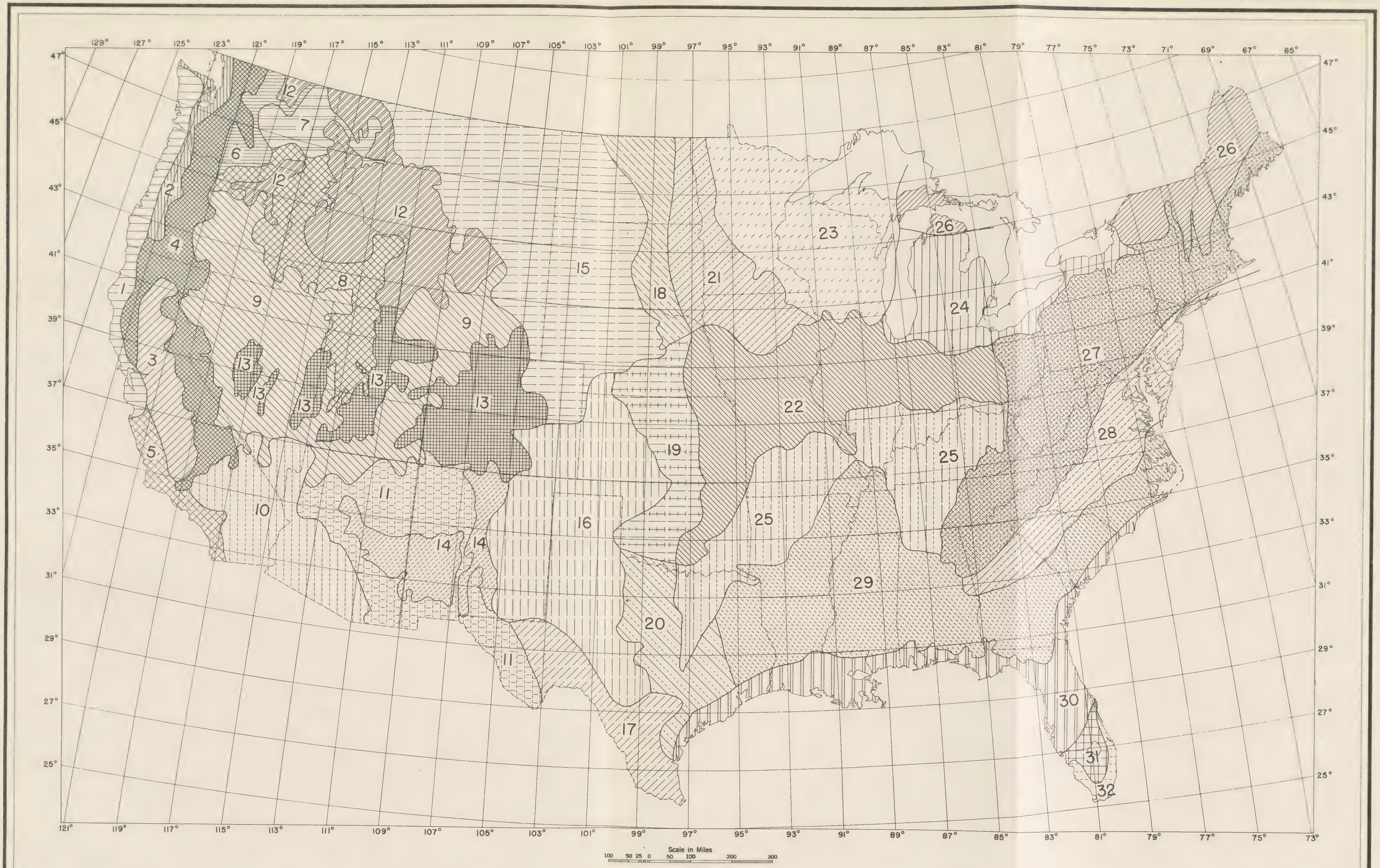
- Wild—Continued.
  - red cherry (*Prunus pennsylvanica*).
  - red plum (*Prunus americana*).
  - sarsaparilla (*Calycocarpum lyonii, Smilax glauca*).
  - snowball (*Ceanothus americanus*).
  - tea (*Amorpha canescens*).
  - yellow plum (*Prunus americana*).
- Wild Goose plum (*Prunus hortulana, Prunus munsoniana*)
- Willow,
  - Acequia (*Salix exigua*).
  - Arroyo (*Salix lasiolepis*).
  - Autumn (*Salix serissima*).
  - Balsam (*Salix balsamifera*).
  - Barclay (*Salix barclayi*).
  - Basket (*Salix purpurea*).
  - Beaked (*Salix bebbiana*).
  - Bearberry (*Salix uva-ursi*)
  - Bebb (*Salix bebbiana*).
  - Black (*Salix nigra*).
  - Blue (*Salix subcoerulea*).
  - Blueback (*Salix glaucops*).
  - Blueleaf (*Salix glaucophylla*).
  - Bluestem (*Salix irrorata*).
  - Bog (*Salix pedicellaris*).
  - Brewer (*Salix breweri*).
  - Caudate (*Salix caudata*).
  - Cherry (*Salix monticola*).
  - Coast (*Salix hookeriana*).
  - Coyote (*Salix exigua*).
  - Crack (*Salix fragilis*).
  - Diamond (*Salix mackenziana*).
  - Dudley (*Salix gooddingii*).
  - Dune (*Salix piperi*).
  - Dusky (*Salix melanopsis*).
  - Dwarf gray (*Salix tristis*).
  - Dwarf pussy (*Salix tristis*).
  - European white (*Salix alba*).
  - False (*Baccharis angustifolia*).
  - False mountain (*Salix pseudomonticola*).
  - Farr (*Salix farrae*).
  - Fire (*Salix scouleriana*).
  - Firmleaf (*Salix pseudomyrsinites*).
  - Fragile (*Salix fragilis*).
  - Geyer (*Salix geyeriana*).
  - Glaucous (*Salix discolor*).
  - Goodding (*Salix gooddingii*).
  - Greensides (*Salix monochroma*).
  - Gulf (*Salix nigra*).
  - Harbison (*Salix harbisonii*).
  - Heartleaf (*Salix cordata*).
  - Hoary (*Salix candida*).
  - Labrador (*Salix argyrocarpa*).
  - Lemmon's (*Salix lemmonii*).
  - Longleaf (*Salix fluviatilis, Salix longifolia*).
  - Lyall (*Salix lasiandra*).
  - Mackenzie (*Salix mackenziana*).
  - Missouri river (*Salix cordata*).
  - Mountain (*Salix scouleriana*).
  - Narrowleaf (*Salix exigua, Salix interior*).
  - Nuttall (*Salix scouleriana*).
  - One color (*Salix monochroma*).
  - Peachleaf (*Salix amygdaloides*).
- Willow—Continued.
  - Piper (*Salix piperi*).
  - Polished (*Salix laevigata*).
  - Prairie (*Salix humilis*).
  - Pretty (*Salix bella*).
  - Pussy (*Salix discolor*).
  - Red (*Salix laevigata, Salix lasiandra*).
  - River (*Salix fluviatilis*).
  - Rosemary (*Salix petiolaris*).
  - Sage (*Salix candida, Salix tristis*).
  - Sandbar (*Salix exigua, Salix interior, Salix sessilifolia*).
  - Satin (*Salix sitchensis*).
  - Shining (*Salix lucida*).
  - Shiny (*Salix lucida*).
  - Sierra (*Salix commutata, Salix orestera*).
  - Silky (*Salix sericea, Salix sitchensis*).
  - Silver (*Salix argyrocarpa, Salix discolor, Salix geyeriana*).
  - Silverleaf (*Salix argophylla*).
  - Sitka (*Salix sitchensis*).
  - Slender (*Salix exigua*).
  - Smooth (*Salix laevigata*).
  - Snap (*Salix fragilis*).
  - Soft-leaved (*Salix sessilifolia*).
  - Swamp (*Salix nigra*).
  - Tealeaf (*Salix planifolia*).
  - Undergreen (*Salix commutata*).
  - Valley (*Salix hindsiana*).
  - Virginia (*Itea virginica*).
  - Ward (*Salix longipes*).
  - Water (*Baccharis emoryi*).
  - Western black (*Salix lasiandra*).
  - White (*Salix lasiolepis*).
  - Wright (*Salix wrightii*).
  - Yellow (*Salix lasiandra, Salix lutea*).
  - Yewleaf (*Salix taxifolia*).
- Willow,
  - baccharis (*Baccharis salicina*).
  - cottonwood (*Populus angustifolia*).
  - oak (*Quercus phellos*).
- Willowleaf,
  - cherry (*Prunus salicifolia*).
  - oak (*Quercus phellos*).
  - spiraea (*Spiraea salicifolia*).
- Wine gooseberry (*Ribes inerme*).
- Winged,
  - elm (*Ulmus alata*).
  - sumac (*Rhus copallina*).
- Wingscale (*Atriplex canescens*).
- Winter,
  - currant (*Ribes sanguineum*).
  - grape (*Vitis berlandieri, Vitis cordifolia*).
  - grape, sweet (*Vitis cinerea*).
- Winterberry, (*Ilex decidua*).
  - Evergreen (*Ilex glabra*).
  - Mountain (*Ilex montana*).
  - Smooth (*Ilex laevigata*).
- Winterfat (*Eurotia lanata*).

- Wintergreen (*Gaultheria procumbens*).
  - Bush (*Gaultheria ovatifolia*).
- Wislizenius,
  - cottonwood (*Populus wislizenii*).
  - oak (*Quercus wislizenii*).
- Wisteria, Kentucky (*Wisteria macrostachya*).
- Witch-alder (*Fothergilla major*).
  - Creeping (*Fothergilla parvifolia*).
  - Dwarf (*Fothergilla gardenii*).
- Witch hazel, (*Hamamelis virginiana*).
  - Little (*Hamamelis vernalis*).
  - Southern (*Hamamelis macrophylla*).
- Witch hobble (*Viburnum alnifolium*).
- Withe rod, (*Viburnum cassinoides*).
  - Naked (*Viburnum nudum*).
  - Shining (*Viburnum nitidum*).
  - Smooth (*Viburnum nudum*).
- Wolf,
  - currant (*Ribes wolfii*).
  - shed (*Forestiera pubescens*).
- Wolfberry, (*Symphoricarpos occidentalis*).
  - Fremont (*Lycium fremontii*).
  - Pale (*Lycium pallidum*).
- Wood vamp (*Decumaria barbara*).
- Woodbine (*Lonicera sempervirens*).
- Wood-waxen (*Genista tinctoria*).
- Woolly,
  - buckeye (*Aesculus discolor*).
  - buckthorn (*Bumelia lanuginosa*).
  - bur-sage (*Franseria eriocentra*).
  - butterflybush (*Buddleia marrubiifolia*).
  - pignut (*Carya villosa*).
  - pipe-vine (*Aristolochia tomentosa*).
- Woollyleaf ceanothus (*Ceanothus tomentosus*).
- Wormwood, silvery (*Artemisia filifolia*).
- Wright,
  - buckwheatbrush (*Eriogonum wrightii*).
  - silktassel (*Garrya wrightii*).
  - willow (*Salix wrightii*).
- Yaupon, (*Ilex cassine*, *Ilex vomitoria*).
  - Desert (*Schaefferia cuneifolia*).
- Yellow,
  - ash (*Cladrastis lutea*).
  - azalea (*Rhododendron calendulaceum*).
  - birch (*Betula lutea*).
  - buckeye (*Aesculus octandra*).
  - buckthorn (*Rhamnus caroliniana*).
- Yellow—Continued.
  - cucumbertree (*Magnolia cordata*).
  - elder (*Tecoma stans*).
  - fir (*Abies grandis*, *Pseudotsuga glauca*, *Pseudotsuga taxifolia*).
  - heather (*Phyllodoce glanduliflora*).
  - honeysuckle (*Lonicera flava*).
  - jessamine (*Gelsemium sempervirens*).
  - linn (*Magnolia acuminata*).
  - locust (*Cladrastis lutea*, *Robinia pseudoacacia*).
  - oak (*Quercus velutina*).
  - opopanax (*Acacia farnesiana*).
  - parilla (*Menispermum canadense*).
  - pine (*Pinus australis*, *Pinus echinata*, *Pinus ponderosa*).
- Yellow,
  - poplar (*Liriodendron tulipifera*).
  - sumac (*Rhus glabra*).
  - willow (*Salix lasiandra*, *Salix lutea*).
  - woodbine (*Lonicera flava*).
- Yellow-flower magnolia (*Magnolia cordata*).
- Yellowleaf silktassel (*Garrya flavescens*).
- Yellowroot (*Xanthorhiza simplicissima*).
- Yellow-wood (*Rhamnus caroliniana*, *Symplocos tinctoria*).
- Yerba de chivata (*Clematis ligusticifolia*).
- Yerba del oso (*Rhamnus californía*).
- Yerba del pasmo (*Adenostoma sparsifolium*).
- Yerba-de-pasmo (*Baccharis ramulosa*).
- Yerba de selva (*Whipplea modesta*).
- Yerba reuma (*Frankenia palmeri*).
- Yerba-santa, (*Eriodictyon trichocalyx*).
  - California (*Eriodictyon californicum*).
  - Narrowleaf (*Eriodictyon angustifolium*).
- Yew,
  - Canada (*Taxus canadensis*).
  - Florida (*Taxus floridana*).
  - Pacific (*Taxus brevifolia*).
  - Western (*Taxus brevifolia*).
- Yewleaf willow (*Salix taxifolia*).
- Zorrillo (*Choisya dumosa*).
- Zenobia (*Zenobia pulverulenta*).

U. S. DEPARTMENT OF AGRICULTURE

PLANT GROWTH REGIONS OF THE UNITED STATES

SOIL CONSERVATION SERVICE



LEGEND

1	North Pacific Coast.
2	Willamette Valley--Puget Sound.
3	Central California Valleys.
4	Cascade-Sierra Nevada.
5	Southern California.
6	Columbia River Valley.
7	Palouse-Bitterroot Valley.
8	Snake River Plain-Utah Valley.
9	Great Basin-Intermontane.
10	Southwestern Desert.
11	Southern Plateau.
12	Northern Rocky Mountains.
13	Central Rocky Mountains.
10	Southern Rocky Mountains.
15	Northern Great Plains.
16	Central Great Plains.
17	Southern Plains.
18	Northern Black Soils.
19	Central Black Soils.
20	Southern Black Soils.
21	Northern Prairies.
22	Central Prairies.
23	Western Great Lakes.
24	Central Great Lakes.
25	Ozark-Ohio-Tennessee River Valleys.
26	Northern Great Lakes-St. Lawrence.
27	Appalachian.
28	Piedmont.
29	Upper Coastal Plain
30	Swampy Coastal Plain.
31	South-Central Florida.
32	Subtropical Florida.

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Plant Growth Regions by Furman Lloyd Mulford, Bureau of Plant Industry, U.S.D.A.

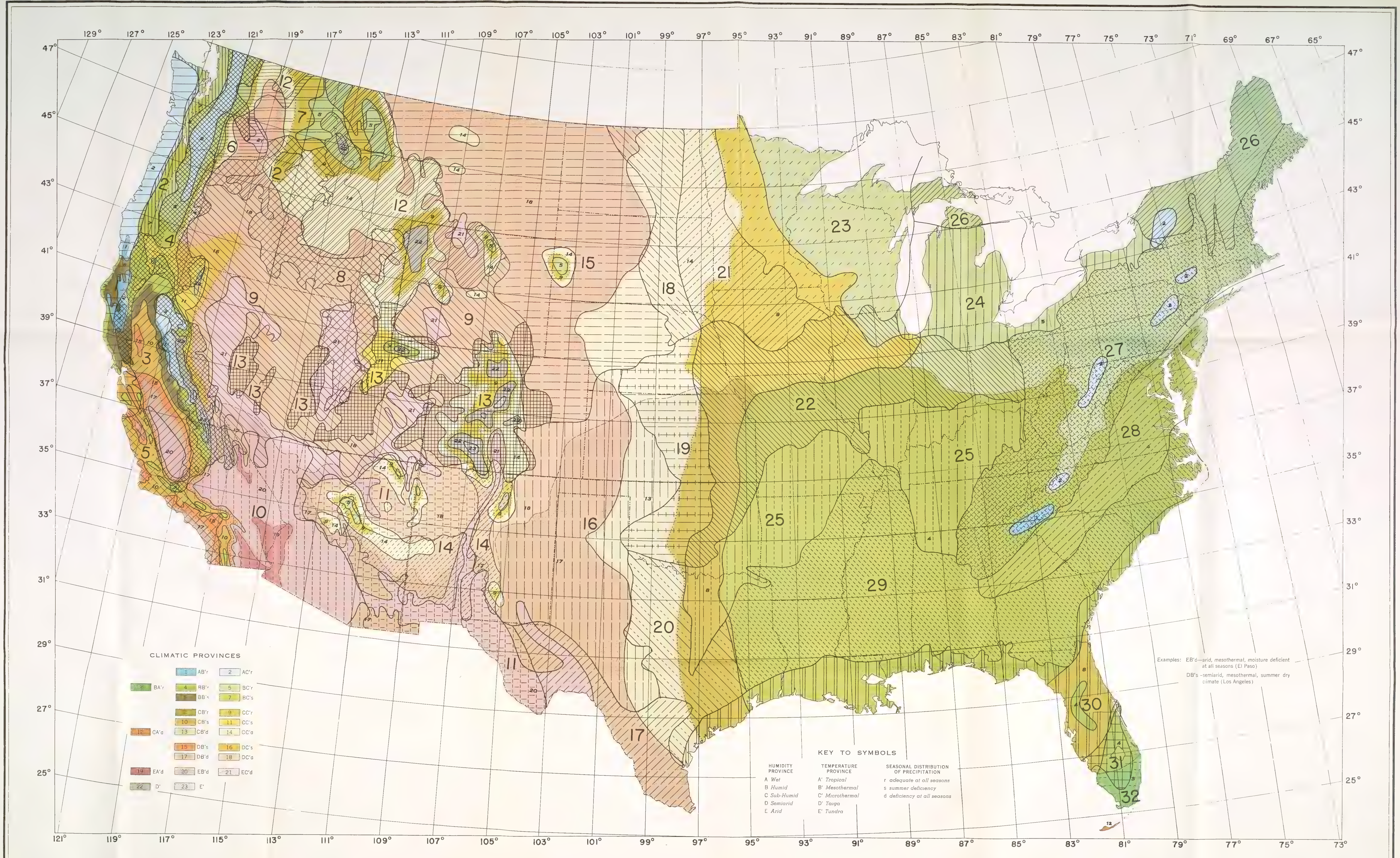
Figure 1

Map prepared by Cartographic Drafting Unit

U. S. DEPARTMENT OF AGRICULTURE

CLIMATIC PROVINCES AND PLANT GROWTH REGIONS OF THE UNITED STATES

Figure 2
SOIL CONSERVATION SERVICE



CLIMATIC PROVINCES

	1 AB'r	2 AC'r
3 BA'r	4 BB'r	5 BC'r
	6 BB's	7 BC's
	8 CB'r	9 CC'r
	10 CB's	11 CC's
12 CA'd	13 CB'd	14 CC'd
	15 DB's	16 DC's
	17 DB'd	18 DC'd
19 EA'd	20 EB'd	21 EC'd
22 D'	23 E'	

KEY TO SYMBOLS

HUMIDITY PROVINCE	TEMPERATURE PROVINCE	SEASONAL DISTRIBUTION OF PRECIPITATION
A *Wet*	A' *Tropical*	r *adequate at all seasons*
B *Humid*	B' *Mesothermal*	s *summer deficiency*
C *Sub-Humid*	C' *Microthermal*	d *deficiency at all seasons*
D *Semiarid*	D' *Taiga*	
E *Arid*	E' *Tundra*	

Examples: EB'd—*arid, mesothermal, moisture deficient at all seasons* (El Paso)
DB's –semiarid, mesothermal, summer dry climate (Los Angeles)

Scale in Miles
100 50 25 0 50 100 200 300

LEGEND FOR CLIMATIC PROVINCES

1	Wet, Mesothermal, Adequate at all seasons.
2	Wet, Microthermal, Adequate at all seasons.
3	Humid, Tropical, Adequate at all seasons.
4	Humid, Mesothermal, Adequate at all seasons.
5	Humid, Microthermal, Adequate at all seasons,
6	Humid, Mesothermal, Summer deficiency
7	Humid, Microthermal, Summer deficiency.
8	Subhumid, Mesothermal, Adequate at all seasons.
9	Subhumid, Microthermal, Adequate at all seasons.
10	Subhumid, Mesothermal, Summer deficiency.
11	Subhumid, Microthermal, Summer deficiency.
12	Subhumid, Tropical, Deficiency at all seasons.
13	Subhumid, Mesothermal, Deficiency at all seasons.
14	Subhumid, Microthermal, Deficiency at all seasons.
15	Semiarid, Mesothermal, Summer deficiency.
16	Semiarid, Microthermal, Summer deficiency.
17	Semiarid, Mesothermal, Deficiency at all seasons.
18	Semiarid, Microthermal, Deficiency at all seasons.
19	Arid, Tropical, Deficiency at all seasons.
20	Arid, Mesothermal, Deficiency at all seasons.
21	Arid, Microthermal, deficiency at all seasons.
22	Taiga.
23	Tundra.

LEGEND FOR PLANT GROWTH REGIONS

1	North Pacific Coast.
2	Willamette Valley -- Puget Sound.
3	Central California Valleys.
4	Cascade - Sierra Nevada.
5	Southern California.
6	Columbia River Valley.
7	Palouse - Bitterroot Valley.
8	Snake River Plain - Utah Valley.
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Climatic Provinces by C. W. Thornthwaite. Soil Conservation Service, U. S. D. A.
Plant growth Regions by Furman Lloyd Mulford, Bureau of Plant Industry, U. S. D. A.

Lith. A. Hoen & Co.

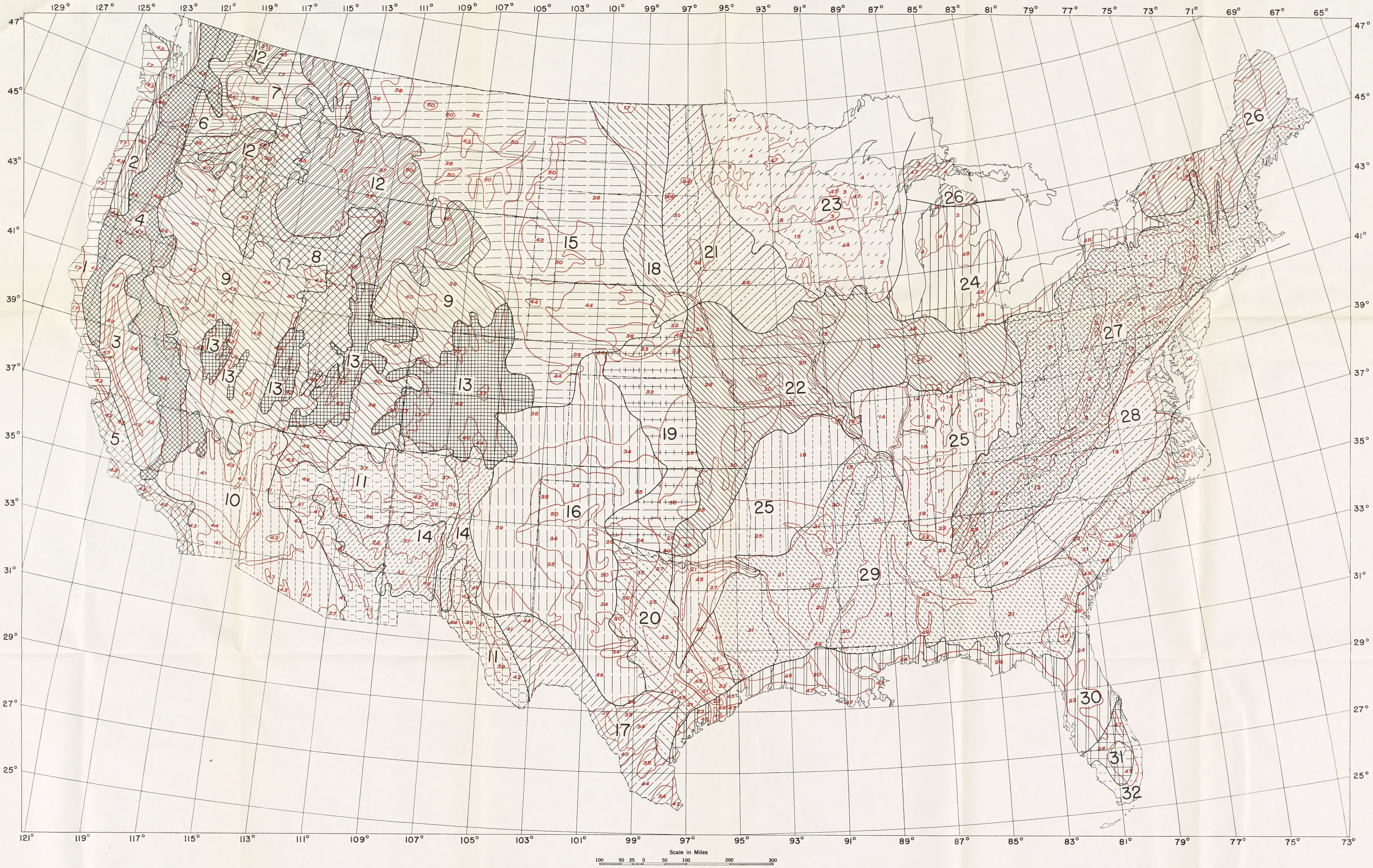
Map prepared by Cartographic Drafting Unit

U. S. DEPARTMENT OF AGRICULTURE

IMPORTANT SOIL REGIONS AND PLANT GROWTH REGIONS OF THE UNITED STATES

Figure 3

SOIL CONSERVATION SERVICE



LEGEND FOR IMPORTANT SOIL REGIONS

The names in parentheses refer to the more extensive or representative soil series in the respective regions.

PODZOLS

1 Rough stony land.

2 Loams and silt loams, developed from sandstones and shales. (Leetonia, De Kalb.)

3 Sands and loamy sands, developed on glacial drift. (Roselawn, Kalkaska.)

4 Loams and clay loams, developed on glacial drift. (Hermon, Ontonagon.)

GRAY-BROWN PODZOLIC SOILS

5 Loams and silt loams, developed on calcareous glacial drift. (Miami, Crosby and Honeoye - Ontario.)

6 Silty loams or stony loams, developed on sandstones and shales. (Muskingum, Westmoreland.)

7 Loams and silt loams, developed on acid glacial drift, sandstone and shale material. (Canfield, Volusia, Lordstown, Wooster.)

8 Stony and gravelly loams, developed on glacial drift. (Gloucester, Troy.)

9 Loams and silt loams, developed on the crystalline rocks of the northern Piedmont. (Chester, Manor.)

10 Sandy loams developed on northern Coastal Plain sands and clays. (Sassafrass, Collington.)

11 Brown silt loams, developed on limestone. (Hagerstown, Maury, Frederick.)

12 Shallow soils developed on interbedded limestone and calcareous shales. (Fairmont, Lowell.)

13 Loams and stony loams from granitic material with hilly to mountainous relief. (Ashe, Porters.)

14 Silt loams with heavy clay subsoils, developed on Illinoian glacial till. (Gibson, Cory, Clermont, Rossmoyne.)

15 Silt loams, developed largely from loess. (Clinton, Fayette.)

16 Imperfectly drained grayish silt loams developed from acid glacial drift. (Spencer.)

17 Loams and silt loams developed from sandstones and shales. (Melbourne.)

18 Grayish-yellow to reddish silt loams, developed from cherty limestones. (Clarksville, Dickson, Baxter.)

RED AND YELLOW SOILS

19 Brownish-red clay loams and gray sandy loams, developed from crystalline rocks of the southern Piedmont. (Cecil, Durham, Appling, Georgeville, Davidson.)

20 Yellow to light brown silt loams, developed on loess. (Memphis, Grenada.)

21 Gray to yellow sandy, fine sandy loams, developed from Coastal Plain materials. (Norfolk, Ruston, Orangeburg.)

22 Brownish-red to red silt loams and clay loams, developed from limestone. (Dewey, Decatur, Fullerton.)

23 Grayish-yellow to light brown sands and fine sands of the Coastal Plain. (Norfolk sands.)

24 Grayish fine sandy loams with some gray or black loams, in the Flatwoods area of the Coastal Plain. (Coxville, Leon, Portsmouth.)

25 Grayish-yellow to reddish fine sandy loams and silt loams, developed from sandstones and shales. (Hartsells, Hanceville, Conway.)

26 Red soils of the Pacific slopes. (Aiken, Sierra, Sites.)

PRAIRIE SOILS

27 Reddish-brown soils, developed on sandstones, shales clays and sands. (Zaneis, Renfrew.)

28 Dark brown silt loams with yellowish-brown subsoils, developed on glacial drift and loess. (Carrington, Tama, Clarion, Marshall.)

29 Dark brown to reddish-brown silt loams and clay loams, developed from limestone and calcareous shales. (Summit, Crawford.)

30 Dark brown or grayish-brown silt loams, having heavy subsoils or claypans. (Cherokee, Parsons, Grundy, Putnam.)

NORTHERN CHERNOZEM

31 Black loams, silt loams and clay loams, developed on calcareous glacial drift or lacustrine deposits. (Barnes, Bearden, Fargo.)

32 Dark grayish-brown loams and silt loams, developed from loess. (Moody, Holdrege.)

33 Dark grayish-brown silt loams with claypans, developed from loess. (Crete, Hastings.)

SOUTHERN CHERNOZEM -- DARK BROWN SOILS

34 Heavy or moderately heavy dark brown soils, developed from calcareous materials. (Pullman, Abilene, Victoria.)

35 Predominantly red and brown sandy loams and sands, developed largely from unconsolidated calcareous materials. (Amarillo, Miles, Duval.)

NORTHERN DARK BROWN (CHESTNUT) SOILS

36 Dark brown soils developed on unconsolidated, calcareous sands, silts, and clays. (Scobey, Rosebud, Keith, Walla Walla.)

37 Dark brown soils, developed on heterogeneous material.

BROWN SOILS

38 (Northern) brown loams, developed on unconsolidated sands, silts and clays. (Joplin, Weld.)

39 (Southern) light brown to gray fine sandy loams to silty clay loams, developed on limestone or unconsolidated sands, silts, and clays. (Uvalde, Reagan.)

SIEROZEM AND DESERT SOILS

40 (Northern) gray and grayish-brown soils, developed on loess and alluvial fans. (Ritzville, Portneuf,)

41 (Southern) gray, brown, and reddish soils, developed on alluvial fans. (Reeves, Mohave.

SOILS OF THE PACIFIC VALLEYS

42 Soils too intimately associated to separate on a schematic map. (San-Joaquin, Fresno, Hanford.)

INTRAZONAL AND AZONAL SOILS

43 Rough and mountainous.

44 Largely sands, some of which are associated with bogs. (Valentine sand, Dune sand, etc.)

45 Black (or brown) friable soil underlain by chalky materials. These soils develop under a prairie vegetation and are known as Rendzinas (Houston, Sumter,)

46 Shallow stony soils from limestone. (Valera, Ector.)

47 Marsh, Swamp and Bog. (Carlisle, Pamlico, Rifle.)

48 Soils developed upon lake plains. (Brookston, Maumee, Vergennes.)

49 Alluvial soils. (Huntington, Sharkey, Columbia, Cass.)

50 Rough broken land, including Pierre soils.

LEGEND FOR PLANT GROWTH REGIONS

▤ 1 North Pacific Coast.
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▤ 7 Palouse - Bitterroot Valley.
▩ 8 Snake River Plain Utah Valley.
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▥ 30 Swampy Coastal Plain.
▦ 31 South - Central Florida.
⬚ 32 Subtropical Florida.

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Important Soils Regions by Bureau of Chemistry and Soils, U. S. D. A.
Plant growth Regions by Furman Lloyd Mulford, Bureau of Plant Industry, U. S. D. A.

Map prepared by Cartographic Drafting Unit